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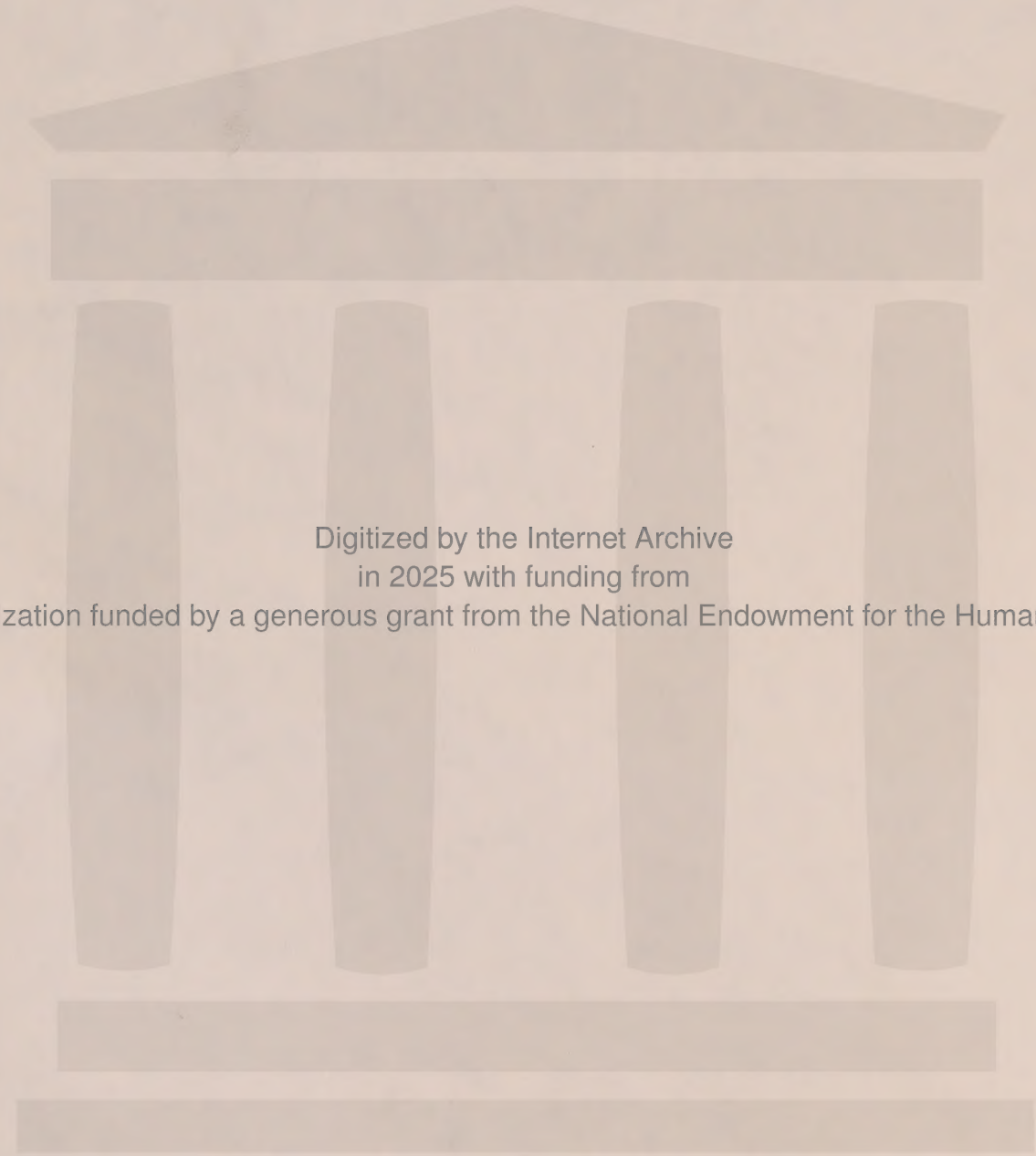

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JAY HOUGHTON
ACE 293-5456
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1625 MASSACHUSETTS

October 11, 1974

The Honorable John C. Sawhill
Administrator
Federal Energy Administration
1200 Pennsylvania Avenue, N.W.
Washington, D. C. 20461

ENERGY CONSERVATION · A WHITE PAPER
(DISCUSSION DRAFT)

Dear Mr. Sawhill:

We have learned that the Federal Energy Administration staff is preparing a document for release in November which causes us great concern. It is our understanding that a portion of this document deals with asserted energy savings that might derive from Federal legislation to mandate, or attempt to mandate, a returnable-only beverage container system.

In your September 9 response to our letter of August 15, in which we expressed concern for your support of measures of this type, you acknowledged that you "...have some doubts about the validity of certain assumptions which he [Bruce Hannon] made during his analysis." If FEA has resolved these questions of validity, we feel that such validation should be made available for public review. In the absence of such clear data as would convince an unprejudiced analyst, we strongly feel it inappropriate for FEA to promote any measure that would have a severe impact on our members as well as disrupt other industries, businesses, and their employees.

As to the Hannon data, we understand that Professor Hannon has made at least two different assessments of "potential energy savings." Apart from the questionable validity of Professor Hannon's data, we assume you are aware of a soon-to-be-released study by Midwest Research Institute (MRI) commissioned by EPA that deals specifically and comprehensively with an assessment of energy used in the manufacture and distribution systems for beverages in various containers. This study has neither been received nor reviewed by all the affected industries, but it is more current and necessarily more objective than Professor Hannon's. The MRI study should be studied by FEA staff after all segments of industry and labor have had an opportunity to review and comment.

With respect to any "assumptions" made by Hannon, MRI or the FEA staff on this most complex matter, they should be viewed and assessed in light of the study on Oregon developments released on September 3, 1974, by an agency of the Oregon legislature. This study attempts to assess the economic impact on the principally affected industries but alludes a number of times to energy costs and savings. While not explicitly noting that energy calculations are not homogeneous, it points out that there will have to be more trucks making more frequent deliveries. This is only one among many increased energy expenditures under a returnable-only system. Clearly, the diesel and gasoline costs in that part of the energy equation are not necessarily equitable with the hydropower costs of manufacturing aluminum for beverage cans or bottle caps. Thus, mere assertions of energy savings must recognize qualitative as well as quantitative aspects of energy consumption involved in a mandated return to a returnable-only system.

As you must know, the vigorous promotion of returnable beverage legislation by certain EPA officials does not reflect a con-census of the Administration. Both the Departments of Commerce and Labor have been developing data to analyze and assess the economic and employment impacts on affected industries and businesses and on labor.

It seems to us highly inappropriate for FEA to assert possible energy savings using as its only basis partisans' attacks which have been only casually reviewed. It clearly is premature for FEA to promote disruptive changes in a marketing system that evolved over three decades when other Federal agencies are still studying the issue.

We regret having to protest inclusion of this portion in the FEA document, but our industry and others have been unreasonably harassed for several years by those offering simple solutions to complex problems.

We most vigorously request that this portion of the FEA report be deleted and that we be given the opportunity to review this matter with appropriate FEA staff.

Respectfully,

M. W. Jensen
President

MORGAN SHAPE 10 Jan 75 COPY

This is Edward P. Morgan, ABC news Washington, with the shape of one Man's Opinion. A look at polluted business practices after this word.

Russell Train, the pleasant-faced, mild mannered Republican ex-tax judge who is the director of the Environmental Protection Agency, may need some protection himself. He is an endangered species--sniped at by conservationists for being too soft on pollution and business lobbies for being too hard on profits. Today he is under heavy fire from the container industry for daring to suggest that recycling bottles and cans on a national scale (as done now successfully in Oregon and Vermont) might save money, energy and the environment.

At a waste management convention in San Francisco last November 14, Train said EPA studies indicate that federal legislation to outlaw the no-deposit no-return process could possibly render 90 per cent of all containers, refillable ten times--making for an energy saving in manufacture equivalent to 92,000 barrels of oil per day. The media paid almost no attention to his report.

But a man named Donald M. Kendall did. A onetime Nixon intimate, head of PepsiCo, the huge worldwide soft drink concern, Kendall wrote Train a blistering three-page letter

on Decenber 12th, with copies to President Ford and Treasury Secretary Simon, accusing him of disservice to the Ford administration, to industry and labor and even hinting at disloyalty. As a document of a tycoon's arrogance to a public official it could become a classic. Kendall's undocumented argument was that the bottle bill, as it's sometimes called would make beverages more expensive and dry up jobs in the brewing and bottling industries.

Ironically, Kendall didn't say a word about how the bill was working in Oregon or Vermont. In telephone interviews, Governor Thomas Salmon, a Democrat, told me it was a "rip roaring success" in Vermont, and Oregon's outgoing Republican Governor Tom McCall said in addition to tidying up the state, it had produced a net gain of 250 jobs.

Pepsi's top man seems unimpressed. On Tuesday, the White House confirms, Kendall saw top presidential aide Donald Rumsfeld. Presumably Train was discussed.

The pressure grows. The National Center for Resource Recovery has contacted at least two high Treasury officials on the issue. NCRR has developed a technology to salvage materials and energy from municipal waste streams. It sells its process to states and localities but with a clause saying they must pay a penalty if they enact bottle bills.

NCRR also has an EPA contract for solid waste work. And who is board chairman of the National Center for Resource Recovery? Donald M. Kendall.

I'll have a footnot in 30 seconds.

Oregon's senior senator, Republican Mark Hatfield backs a bill banning throwaway bottles and cans nationwide. Ironically the Nixon administration endorsed the principle last spring. Pepsi's Kendall must not have been listening.

This is Edward P. Morgan ABC News Washington with the shape of one man's opinion.

Council of the District of Columbia
News Release

City Hall, 14th and E Streets, N.W. Fifth Floor 638-2223 or Government Code 137-3806

March 14, 1975

STRONGER BOTTLE BILL WOULD INCREASE JOBS AND SAVE $10 MILLION

Today Councilmember Julius Hobson introduced a Returnable Beverage Container Bill that would increase jobs in the District by 100-200 positions and decrease the District's FY 1976 budget by nearly $10 million or 1% of the total budget. Mr. Hobson stated that the $10 million would be saved by precluding the need for the District to contract with Nixon intimate Donald Kendall's National Center for Resource Recovery. The 1976 Capital Budget (page LA-CAP-6) presently calls for the District to finance an energy intensive facility to pick out bottles and cans from the waste stream at the Lorton landfill.

Mr. Hobson further stated that the Returnable Beverage Container Bill will help relieve the city's growing solid waste problem, conserve energy and natural resources, and protect the public's health and safety. This would be accomplished by requiring a minimum refund value of ten cents on all beverage containers sold in Washington, D.C. The bill, which would take effect on June 1, 1976 has strong penalties for violation and provides the opportunity for public enforcement with a citizen suit provision.

Councilmember Hobson believes that doubling the value of returnable beverage containers and not waiting for the other Washington Metropolitan Area jurisdictions to enact a similar bill, as was the case with previous proposals, would provide strong immediate relief to the city's chronic solid waste management problem which will be compounded with the expected tourist increases during the bicentennial.

"All District residents, by working together, can take pride in establishing a conservation ethic in the Nation's capital--conserving energy and other natural resources, and reducing litter -- and still save $10 million of our tax money," Hobson said.

Mr. Hobson, therefore, urges passage of the Returnable Beverage Container Bill.

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Mr. Hobson, therefore, urges passage of the Returnable Beverage Container Bill.

Council of the District of Columbia
Report

City Hall, 14th and E Streets, N.W. Fifth Floor 638-2223 or Government Code 137-3806

To All Council Members

From Julius W. Hobson, Councilmember at large

Date March 14, 1975

Subject Introduction of a bill entitled, "The Returnable Beverage Container Act of 1975" (RBCA)

I am presenting a bill entitled, "The Returnable Beverage Container Act of 1975" to be introduced before the Council at the next legislative session on Tuesday, March 18, 1975. Aspects of this bill which differ from the previously introduced Beverage Container Act (BCA) include items: 1, 5, 9, 10, 11, and 12.

Expected benefits include:

1. Establishing a "conservation ethic" in the Nation's Capital visable during the bicentennial -- with strong citizen incentives.

2. Adding significantly to increasing the potential income of our young unemployed* (through an estimated 100-200 new jobs and container collection refunds).

3. Reducing the 1976 capital budget by 10 million dollars.

Essential elements of RBCA:

4. Apply to beer and other malt beverages, mineral water, soda water and carbonated soft drinks.

5. Require a minimum refund value of ten cents on all beverage containers.

6. Require dealers and distributors to accept beverage containers for refund at the place and sale of delivery.

7. Require that each non-refillable beverage container sold in the District to state its refund value and the fact that it was sold within the District of Columbia.

8. Ban "pop top" cans with discardable parts.

*Currently estimated at 22% for people under 25 (based on the number of people who have applied for unemployment compensation).

9. Ban plastic beverage containers.

10. Provide for strong enforcement sanctions.

11. Provide for citizen action against a person who violates the provisions of the Act or against the Mayor should the executive not enforce the regulation.

12. Would go into effect immediately upon enactment and would not depend upon passage of a similar bill in the surrounding jurisdiction.

DESCRIPTION OF MAJOR CHANGES

Several weeks ago Councilmember Polly Shackleton introduced a returnable container's bill, entitled the Beverage Container Act of 1975 (BCA). The attached bill although similar in some respects to BCA has a number of basis differences as noted above:

- The Returnable Beverage Container Act would take effect on June 1, 1976. BCA would take effect on July 1, 1976. Implimenting a refillable beverage container regulation in June 1976 would coinside with the summer bicentennial celebration and increases in tourism. The Mayor could authorize the use of CETA funds to aid dealers and distributors with additional labor costs for a minimum of six months.

- The Returnable Beverage Container Act calls for a minimum cash refund value of ten cents rather than five cents proposed in the previously introduced "bottle bill." A ten cent refund would provide a more adequate incentive for young people and adults to return beverage containers in a tourist oriented capital with daily parades, demonstrations, and public meetings -- particularly during the bicentennial year.

- The enforcement provisions of the Returnable Beverage Container Act would be stronger than the earlier bill. RBCA calls for a $1,000 fine for each day of non-compliance rather than a $50 fine. Any large retail dealer could elect to write off a $50 a day loss in fines in order to maintain non-returnable beverage containers.

- The Returnable Beverage Container Act also provides an opportunity for a citizen to initiate civil action against a dealer or distributor who violates the provisions of this Act or against

the Executive where there is an alleged failure on his part to carry out the Act's provisions. This provision adds strength to the enforcement provisions in the event there is laxity in bringing about compliance on the part of the Executive.

- In addition to the ban on "pop top" cans, the use of one-way plastic beverage containers would be prohibited. The plastics industry is now in the process of test marketing plastic beverage containers. Although lighter and less susceptible to breakage than glass, present methods of disposing of such containers can pose a hazard to public health and safety. Even if incinerated the plastic containers would give off lethal vinyl chloride and cyanide gas fumes adding further to the problem of air quality and pollution in the District.

- Finally the Returnable Beverage Container Act would become effective immediately upon enactment and would not depend upon enactment of similar acts in the surrounding jurisdictions. The Council has the opportunity to pass a progressive and far reaching piece of legislation which place a premium on the environment and the quality of life for the residents in the District. Passage of this bill would set the trend for other jurisdictions within the region and nation to follow.

MAJOR ISSUES

Labor and Economic Impact

One primary purpose of the Returnable Beverage Container Act is to increase jobs for District residents and decrease the capital budget. Implementation of this bill would create from 100 to 200 new jobs for District residents at the retail and wholesale levels and possibly at the distribution level since distributors would have to hire more people to handle the returnables and the increased bookkeeping. These jobs would provide much needed employment in the city for people with minimal skills. In Oregon where a returnable beverage container program has been in effect for $2\frac{1}{2}$ years, there has been a net increase of 250 jobs.

The bill would reduce the Capital Budget by nearly $10 million by precluding the need for the District to contract with Nixon intimate Donald Kendall's National Center for Resource Recovery. The FY 1976 Capital Budget (page LA-CAP-6) presently calls for the District to finance an energy intensive facility to extract bottles and cans from the waste stream at the Lorton landfill (any additional employment resulting from the building of this facility will not occur in D.C.). Prior to any expenditure, the District should evaluate all resource recovery systems -- particularly those that maximize energy recovery rather than materials recovery (i.e., bottles and cans).

People such as Mr. Joseph Danzansky of Giant Food and other large grocery store owners have objected to previous "bottle bills" because of the expense incurred with additional labor costs in the handling of returnable beverage containers. The Mayor is encouraged to authorize the use of Comprehensive Employment Training Act (CETA) funds to assist local grocers and liquor store owners in making the transition to the use of the less wasteful returnable beverage container system.

Reduction of the Solid Waste Stream

A second purpose of this bill is to decrease the solid waste stream and thereby reduce the burden on the city's beleaguered solid waste collection and disposal system.

According to studies done by the Environmental Protection Agency (EPA) beverage containers alone account for approximately 7% of the total waste stream nationally, and they are becoming an increasingly large component of municipal waste. The EPA estimates that a national returnable beverage container regulation would result in a 65-75% reduction of that portion of solid waste and reduce the total municipal waste stream by 4-6%. During hearings in 1971, the spokesman for the D.C. Department of Sanitary Engineering estimated that a local returnable beverage container regulation could yield a minimum reduction of 2% in dry refuse and 11% in incinerator residue.

Tied to this question of solid waste management is the problem of litter. The Returnable Beverage Container Act would provide an incentive to reduce litter. Beverage containers comprise over 20% of the litter in the City, and it is one of the most visable and dangerous components. Giving the containers a monetary value of ten cents would encourage both adults and young people to pick up a returnable container for the deposit. There is no question that this regulation would actually reduce litter in our streets and alleys.

In Oregon the Allied Decision System Study made in 1974 revealed that the beverage container portion of litter has been reduced 66 percent since the passage of Oregon's "bottle bill." This translates into a 10.9% reduction in total litter. In Washington this would mean a 13.8% reduction in total litter. Furthermore, a reduction in this component of litter would mean a saving in the money spent on litter collection and disposal by the City... similar to the experience of both Vermont and Oregon. This last point cannot be over emphasized with the approach of the bicentennial celebration when great numbers of tourists will visit the nation's capital next year.

Conservation of Energy and Natural Resources

A third purpose is to conserve energy and natural resources. Refillable beverage containers provide an inexpensive and energy-saving alternative to the continued proliferation of energy wasting and resource consuming disposable beer and soft drink containers. The natural resource conservation aspect of using one glass container an average of ten times over rather than using a glass or metal container once is obvious.

The reuse of beverage containers would also yield energy saving dividends. EPA estimates that a refillable container making 10 trips (the national average for returnable beverage containers now in circulation) uses one-third of the energy that it takes to produce 10 one-way containers. On a national basis resumption of an all returnable beverage container system could almost immediately save an energy equivalent of nearly 5 million gallons of gasoline per day. Put in different terms the energy consumed in supplying the nation with beer and soft drinks in throw-away containers would supply all the electrical needs of Pittsburg, Washington, D.C. and San Francisco for one year.

Protection of Public Health and Safety

A fourth purpose of RBCA is to protect the public health, safety and welfare of District residents. Glass beverage containers left in streets, alleys, and playgrounds, if not shattered purposely, break with time, creating an obvious health and safety menace to people and pets. The "pop top" container is banned as a safety measure. The detachable piece, once discarded, poses a hazard to children playing in bare feet and pets because of its sharp edges. In addition, plastic beverage containers are prohibited because of the health threat posed by the emission of vinyl chloride and cyanide fumes when incinerated.

I feel that the Returnable Beverage Container Act of 1975 is an important and urgent piece of legislation. It provides a means for solving the City's chronic solid waste problem, conserves energy and natural resources and protects the public's health and safety. However, probably the most important immediate benefit is to increase jobs for D.C. residents while saving the District almost $10 million in capital expenditure. I urge all councilmembers to join me in co-sponsoring this bill.

A BILL

In the Council of the District of Columbia

Councilmember Hobson introduced the following bill which was referred to

To require a minimum refund of ten cents on all empty beverage containers.

Be it enacted by the Council of the District of Columbia, that this act may be cited as the "Returnable Beverage Container Act of 1975."

Sec. 2. It is the purpose of this act to-

(a) Establish a "conservation ethic" in the Nation's Capital visable during the bicentennial with strong incentives and to increase the number of jobs available for the residents of the District;

(b) Protect the environment by reducing the solid waste stream and thereby ease the burden of the disposing of this class of refuse from the District of Columbia solid waste disposal facilities and further reduce the District's need to allocate funds for handling this class of refuse;

(c) Conserve the energy and resources needlessly expended and wasted on the manufacture of one way beverage containers;

(d) Protect the public health, safety and welfare;

(e) Permit the public to participate in reducing the solid waste stream and enforcing the provisions of this act;

(f) Preclude the need for the District of Columbia to contract for the building of a resource recovery facility to extract bottles and cans from the District's solid waste stream.

Sec. 3. For the purposes of this Act, the following terms, words, and their derivations shall have the meaning given herein. When not inconsistent with the content, words used in the present tense include the future, words in the singular number include the plural number. The word "shall" is always mandatory and not merely directory.

(a) The term "Beverage" means carbonated, natural or mineral waters, soda water and similar carbonated soft drinks, and beer or other carbonated malt drinks, in liquid form and intended for human consumption.

(b) The term "Beverage container" means an airtight metal, glass, paper or plastic bottle, jar, can or carton containing a

(c) The term "Returnable beverage container" means a beverage container for which a minimum deposit of ten cents is paid upon purchase and for which a refund of equal value is payable, by any dealer upon return of said beverage container by the consumer and by the distributor upon return of said beverage container by the dealer.

(d) The term "Consumer" means any person who purchases a beverage in a beverage container for use or consumption, without intent to resell.

(e) The term "Dealer" means every person who engages in the commercial sale of beverage containers to a consumer.

(f) The term "Beverage vending machine" means a coin operated machine for selling individual beverages in beverage containers.

(g) The term "Distributor " means every person who engages in the sale of beverages in beverage containers to a dealer in the District of Columbia including any manufacturer who engages in such sales.

(h) The term "Manufacturer" means every person bottling, canning, or otherwise filling beverage containers for sale to distributors or dealers.

Sec. 4. Every beverage container in which beverages are sold or [illegible] sale in the District of Columbia after June 1, 1976, shall have a cash refund value of ten cents

Sec. 5. The act stipulates

(a) A dealer shall not refuse to accept from a consumer after June 1, 1976, any empty beverage containers of the kind, size and brand of beverage sold by the dealer, or refuse to pay in cash to the consumer the refund value of a beverage container established pursuant to Sec. 4 of this act, if the empty returnable

beverage container is presented at the location at which the dealer sells or offers for sale such beverages in returnable containers to consumers.

(b) A distributor shall not refuse to accept from a dealer after June 1, 1976, any empty beverage containers of the kind, size and brand of beverage sold by the distributor, or refuse to pay in cash to the dealer the refund value of a container as established pursuant to Sec. 4 of this , if the empty beverage containers are presented at the time and location of any delivery of filled beverage containers by the distributor to the dealer.

Sec. 6 The act requires -

(a) All beverages dispensed in beverage vending machines after June 1, 1976, shall be sold in returnable beverage containers or paper cup machines.

(b) For returnable containers in beverage vending machine

size and brand sold or offered for sale by

provide a means whereby the returnable containers may be conveniently stacked, should the consumer choose to forfeit the

Sec. 7. No person shall sell or offer for sale in the Distri Columbia, after June 1, 1976, any metal beverage container so designed and constructed that a part of the container is detachable in opening the container

without the aid of a can opener.

Sec. 8. No person shall sell or offer for sale in the District of Columbia after June 1, 1976 any beverage container made of plastic designed for one way use.

Sec. 9. No distributor shall offer for sale in the District of Columbia after June 1, 1976, a beverage container that does not clearly indicate in a securely affixed manner the following information: (1) the beverage container is to be sold within the District of Columbia, and (2) the refund value of the beverage container in the amount specified in Sec. 4 of this act.

Sec. 10. Any person who violates any provision of this act shall be deemed guilty of a misdemeanor and upon conviction thereof before a court of competent jurisdiction, shall be fined in an amount up to $1,000 for each day of non compliance. Each day that such violation is committed or permitted to continue shall constitute a separate offense. In addition, thereto, the Mayor of the District of Columbia or his authorized representative, may institute an injunction or any other appropriate actions or proceeding for the enforcement of the Act

permanent injunctions or other appropriate forms of remedy or re

Sec. 11. Any person may commence a civil action on his own behalf -

(a) against any person (including the District of Columbia to the extent permitted by the Eleventh Amendment to the United States Constitution) who is alleged to be

requirement of this act or (2) in violation of any order issued by the Mayor with respect to any such requirement or (3) engaged in any act prohibited by this act; or

(b) against the Mayor where there is alleged a failure of the Mayor to perform any act or duty under this act which is not discretionary with the Mayor.

Any action under this section shall be brought in the Superior Court of the District of Columbia. The Superior Court of the District of Columbia shall have jurisdiction, without regard to the amount of controversy, or to enforce such a requirement, or such an order, or to order the Mayor to perform such act or duty, as the case may be.

(c) No action may be commenced under this section -

(1) prior to sixty days after the plaintiff has given notice of the violation (i) to the Mayor, and (ii) to any alleged violator of the requirements, or

(2) if the Mayor has commenced and is diligently prosecuting a civil action in an appropriate court of the District of Columbia to require compliance with the requirement of or

Sec. 12. The provisions of this act are severable, and if any provision, sentence, clause, section or part thereof is held illegal, invalid, or unconstitutional or inapplicable to any person or circumstances, such illegality, invalidity, unconstitutionality, or inapplicability shall not affect or impair any of the remaining provisions, sentences, clauses, sections or parts of this act or their application to other persons and circumstances.

It is hereby declared to be the legislative intent that this act would have been adopted if such illegal, invalid, or unconstitutional provisions, sentences, clauses, sections, or parts had not been included therein, and if the person or circumstances to which the act or any part thereof is inapplicable had been specifically exempted therefrom.

Sec. 13. This act shall be effective at the end of the 30 day period provided for Congressional review of acts of the Council of the District of Columbia in Section 602(c) of the District of Columbia Self-Government and Governmental Reorganization Act.

A BILL

In the Council of the District of Columbia

Councilmember Hobson introduced the following bill which was referred to

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(b) Protect the environment by reducing the solid waste stream and thereby ease the burden of the disposing of this class of refuse from the District of Columbia solid waste disposal facilities and further reduce the District's need to allocate funds for handling this class of refuse;

(c) Conserve the energy and resources needlessly expended and wasted on the manufacture of one way beverage containers;

(d) Protect the public health, safety and welfare;

(e) Permit the public to participate in reducing the solid waste stream and enforcing the provisions of this act;

(f) Preclude the need for the District of Columbia to contract for the building of a resource recovery facility to extract bottles and cans from the District's solid waste stream.

Sec. 3. For the purposes of this Act, the following terms, words, and their derivations shall have the meaning given herein. When not inconsistent with the content, words used in the present tense include the future, words in the singular number include the plural number. The word "shall" is always mandatory and not merely directory.

(a) The term "Beverage" means carbonated, natural or mineral waters, soda water and similar carbonated soft drinks, and beer or other carbonated malt drinks, in liquid form and intended for human consumption.

(b) The term "Beverage container" means an airtight metal, glass, paper or plastic bottle, jar, can or carton containing a beverage under pressured carbonation. Cups and other open receptacles are specifically excluded from this definition.

(c) The term "Returnable beverage container" means a beverage container for which a minimum deposit of ten cents is paid upon purchase and for which a refund of equal value is payable, by any dealer upon return of said beverage container by the consumer and by the distributor upon return of said beverage container by the dealer.

(d) The term "Consumer" means any person who purchases a beverage in a beverage container for use or consumption, without intent to resell.

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(b) A distributor shall not refuse to accept from a dealer after June 1, 1976, any empty beverage containers of the kind, size and brand of beverage sold by the distributor, or refuse to pay in cash to the dealer the refund value of a container as established pursuant to Sec. 4 of this , if the empty beverage containers are presented at the time and location of any delivery of filled beverage containers by the distributor to the dealer.

Sec. 6 The act requires -

(a) All beverages dispensed in beverage vending machines after June 1, 1976 shall be sold in returnable beverage containers or paper cup machines.

(b) For returnable containers in beverage vending machine sales, dealers shall provide a means whereby the returnable containers of any kind, size and brand sold or offered for sale by him, may be returned for deposit. If the deposit refund cannot be offered at the site of the beverage vending machine, the dealer shall provide a means whereby the returnable containers may be conveniently stacked, should the consumer choose to forefeit the deposit.

Sec. 7. No person shall sell or offer for sale in the District of Columbia, after June 1, 1976 , any metal beverage container so designed and constructed that a part of the container is detachable in opening the container

without the aid of a can opener.

Sec. 8. No person shall sell or offer for sale in the District of Columbia after June 1, 1976 any beverage container made of plastic designed for one way use.

Sec. 9. No distributor shall offer for sale in the District of Columbia after June 1, 1976, a beverage container that does not clearly indicate in a securely affixed manner the following information: (1) the beverage container is to be sold within the District of Columbia, and (2) the refund value of the beverage container in the amount specified in Sec. 4 of this act.

Sec. 10. Any person who violates any provision of this act shall be deemed guilty of a misdemeanor and upon conviction thereof before a court of competent jurisdiction, shall be fined in an amount up to $1,000 for each day of non compliance. Each day that such violation is committed or permitted to continue shall constitute a separate offense. In addition, thereto, the Mayor of the District of Columbia or his authorized representative, may institute an injunction or any other appropriate actions or proceeding for the enforcement of the Article or to correct violations of this act in the Superior Court of the District of Columbia, which may issue restraining orders temporary or permanent injunctions or other appropriate forms of remedy or relief.

Sec. 11. Any person may commence a civil action on his own behalf -

(a) against any person (including the District of Columbia to the extent permitted by the Eleventh Amendment to the United States Constitution) who is alleged to be (1) in violation of any

requirement of this act or (2) in violation of any order issued by the Mayor with respect to any such requirement or (3) engaged in any act prohibited by this act; or

(b) against the Mayor where there is alleged a failure of the Mayor to perform any act or duty under this act which is not discretionary with the Mayor.

Any action under this section shall be brought in the Superior Court of the District of Columbia. The Superior Court of the District of Columbia shall have jurisdiction, without regard to the amount of controversy, or to enforce such a requirement, or such an order, or to order the Mayor to perform such act or duty, as the case may be.

(c) No action may be commenced under this section -

(1) prior to sixty days after the plaintiff has given notice of the violation (i) to the Mayor, and (ii) to any alleged violator of the requirements; or

(2) if the Mayor has commenced and is diligently prosecuting a civil action in an appropriate court of the District of Columbia to require compliance with the requirement of order.

Sec. 12. The provisions of this act are severable, and if any provision, sentence, clause, section or part thereof is held illegal, invalid, or unconstitutional or inapplicable to any person or circumstances, such illegality, invalidity, unconstitutionality, or inapplicability shall not affect or impair any of the remaining provisions, sentences, clauses, sections or parts of this act or their application to other persons and circumstances.

It is hereby declared to be the legislative intent that this act would have been adopted if such illegal, invalid, or unconstitutional provisions, sentences, clauses, sections, or parts had not been included therein, and if the person or circumstances to which the act or any part thereof is inapplicable had been specifically exempted therefrom.

Sec. 13. This act shall be effective at the end of the 30 day period provided for Congressional review of acts of the Council of the District of Columbia in Section 602(c) of the District of Columbia Self-Government and Governmental Reorganization Act.

HATFIELD INTRODUCES NATIONAL MANDATORY DEPOSIT LEGISLATION

Legislation requiring a refundable 5¢ deposit on virtually all beer and soft drink containers sold in interstate commerce was introduced Feb. 7 [illegible] by Sen. Mark O. Hatfield (R.-Ore.) and co-sponsored by Sens. Jacob Javits (R.-N.Y.), George McGovern (D.-S.D.), Bob Packwood (R.-Ore.), and Robert Stafford (R.-Vt.). Bill would effectively prohibit the use of detachable openers on beverage cans within one year after enactment and impose a 5¢ deposit on all beverage containers within three years after enactment. Similar legislation has already been introduced in the House, but an unofficial "companion" bill is expected soon from the Congressional delegations of Oregon, Vermont and South Dakota -- three states which have enacted their own mandatory deposit legislation.

If the introduction of Hatfield's legislation formally marks the beginning of this year's campaign for a national "bottle bill," it actually represents the continuation of a long and usually bitter lobbying effort on both sides of the question. Most of the action has taken place outside of Washington -- more than 30 states and 25 communities have considered or are considering various types of container regulation -- but this year, given the obvious pro-environmentalist bias of the new Congress, proponents and opponents alike are doing everything in their power to influence the decision-makers. According to one estimate, unions and industries opposing the legislation are spending about $20-million annually to defeat container regulation throughout the country; though proponents have relied primarily on the mobilization of volunteers and sympathetic officials to spread their message, the support of Environmental Protection Agency's Office of Solid Waste Management Programs has been of inestimable value.

Convinced that the Administration's approval of EPA's position last year represented some sort of bureaucratic misunderstanding, and aware that a national "bottle bill" might actually come to a vote in Congress this year or next, opponents have launched an intensified effort against EPA's position reaching to the highest levels of government. While OSWMP still has the support of several high-level EPA officials, environmentalists sense that EPA administrator Russell E. Train may be wavering under pressure and are preparing a counterattack.

PEPSICO's Kendall Spearheads Opposition Effort

PEPSICO's Donald M. Kendall kicked off the latest opposition effort with a Dec. 12 letter to Train denouncing his advocacy of mandatory deposit legislation as a "disservice to the Administration, to industry and labor, and to the nation..." Copies of Kendall's letter were forwarded to President Ford, his chief of staff Donald Rumsfeld, and Treasury Secretary William Simon.

Kendall's letter takes [illegible] points to support [illegible] EPA's position is directly counter to the President's war on inflation and [illegible] solution to solid waste problems; (3) that EPA's position [illegible] the voting booth; (4) that advocacy of consumer product legislation results [illegible] [illegible] efforts by [illegible] possibility; (5) that EPA's [illegible] of dollars by extended legislative debate on the [illegible] [illegible] helped to keep the Government together with [illegible]

[illegible] total of [illegible] lives of the elected [illegible] "If you do not," Kendall said, "[illegible]

[illegible] Legislation (Cont.)

On Jan. 7, Kendall met with Rumsfeld [illegible] to discuss [illegible] deposit issue; the next day, he headed a delegation of industry and union [illegible] from meeting with Treasury Department officials on [illegible]. Lesher, president of the National Center for Resource Recovery, also attended that meeting, at the invitation of Kendall, who chairs NCRR's board of directors. An NCRR spokesman told SWR that Lesher was present only to provide information on resource recovery and that he did not and will not "lobby" against mandatory deposit legislation, despite his personal opposition to such measures. Subsequent meetings were held with Commerce Secretary Frederick Dent and, still later, Federal Energy Administration officials were called to the White House for a briefing on the issue by the U.S. Brewers Association.

Finally, on Feb. 8, Train responded to Kendall's letter. "I realize that our views on this subject start from different philosophical perspectives," Train said, "but I don't believe that we are really as far apart as you seem to feel. I certainly appreciate your views -- as I do those of others who are concerned with waste [illegible] -- and I am sure that [illegible] discussions that will take place on this subject in the weeks and months ahead." On Feb. 10, Train met personally with industry and labor officials, promising a series of future meetings to review technical data.

Alerted to the situation by a critical commentary on the subject by ABC News' Edward P. Morgan, Environmental Action drafted a letter to Train expressing concern that Kendall's letter "was only the first step in a well-orchestrated attempt to discredit the work of EPA" and others on mandatory deposit legislation. "Mr. Kendall's letter appears to be one of the most indefensible and outrageous communications yet on this issue," the letter says, requesting a meeting at the earliest mutually convenient time to discuss the matter. When the letter is delivered tomorrow, copies will be forwarded to President Ford, Rumsfeld, Dent and EPA chief Frank Zarb; signatories include most major environmental and public interest groups supporting mandatory deposit legislation, as well as the National Association of Counties.

Bottles Before Advisory Committee Panel

Meanwhile, the campaign continues. Responding to the recent report of the Citizens Advisory Committee on Environmental Quality which [illegible] deposit legislation (SWR, Feb. 3, 1975, p. 14), the United States Brewers Association charged that it considers support of restrictive container legislation to be a diversionary tactic unresponsive to the solid waste problem which "will result in valuable resource and energy saving and producing effects, will cost the consumer, will result in further loss of jobs, and will weaken the total systems approach to solid waste re[illegible] of [illegible] energy."

USBA said it "applauds the committee's support of [illegible] and [illegible] to provide revenues [illegible] recycled materials [illegible] obtained [illegible] ... [illegible] said, "but if [illegible] ment and [illegible]

In a related development, the [illegible] bar [illegible] legislation [illegible] "bottle ban" bills will [illegible] ... [illegible] ... without adding to consumer co[illegible] ... pointed out, the past two years, six [illegible] ... containers for punitive legislation [illegible] ... local voters across the country. All have been defeated." A survey of voters following the defeat of a mandatory deposit referendum in Dade County, Fla., conducted by a market research firm and funded by the industry, showed [illegible] ... referendum were concerned about in[illegible] costs. "[illegible] numbers of the pro-post of still [illegible] ... for restricted product, and for no convincing [illegible]."

EPA Sabotaged by Container Lobby

By Jack Anderson and Les Whitten

A move to clean up the throwaway cans and bottles that litter America has been sabotaged in the backrooms of the Environmental Protection Agency.

Every year, an astounding 60 billion throwaways are scattered across the American landscape — tossed in trash cans, strewn along roadways, dropped into lakes and streams. This not only is a staggering waste but a stupendous pickup problem.

As the first step toward reducing the debris, the EPA drafted new guidelines on June 2. These would require customers to pay a container deposit on beverages they purchase on federal premises. To get their deposit back, they would have to turn in their empty beer bottles and cola cans.

Although the rules would apply only to national parks, military camps and other federal facilities, the intention also was to encourage cities, counties and states to adopt similar measures.

But if this seemed a simple, logical solution, the advocates at EPA didn't reckon with the greed of the manufacturers, who rake in huge profits from throwaways.

Nor did the advocates take into account the political power of the likes of the U.S. Brewers Association, Aluminum Co. of America, Reynolds Metals, Can Manufacturers Institute, National Soft Drink Association and Glass Container Manufacturers Institute.

The story of what happened has been carefully locked in EPA files, where it was supposed to be hidden from the public. But we have obtained the suppressed memos and letters.

The manufacturers' of cans and bottles are spending $20 million to thwart the EPA cleanup scheme. Even more dismaying, the container tycoons have been able to pull strings inside the EPA and to get inside information for their lobbying campaign.

For example, the June 2 guidelines were supposed to be kept secret until they were published in the Federal Register. The purpose of this rule is to prevent undue political pressure at the planning level.

But on June 19, copies of the draft guidelines were slipped to the can-and-bottle lobby. The official who leaked the material was EPA's solid-waste director, H. Lanier Hickman. We have a copy of his transmittal letter asking the industry for its "review and comment." None of the material was leaked to the environmentalists, who were equally interested in the guidelines.

Armed with this inside information, the powerful lobby began to mobilize against the EPA plan even as EPA chief Russell Train was proclaiming his public support of "a mandatory deposit measure."

The U.S. Brewers, for example, distributed a costly, 38-page lobbying package to beer wholesalers. They were urged to write their members of congress. Legal opinions, economic arguments and other helpful letter-writing hints were included. Also listed were names of every senator and House member who might conceivably have anything to do with the throwaway problem.

Already this lobbying campaign has stimulated a flood of letters to EPA from Capitol Hill. More than 200 members of Congress have written to EPA about the guidelines.

Yet Hickman, far from being punished for alerting the industry, has been promoted. Other EPA officials met privately on Aug. 13 with representatives from Reynolds Metals, American Can, U.S. Brewers, Coca-Cola, Bethlehem Steel, Owens-Illinois and related unions.

The confidential minutes show, incredibly, that another top EPA official, Acting Deputy Assistant Administrator Robert Colonna, slipped the lobbyists "copies of the comments made by other federal agencies during our agency review."

These comments, which are supposed to be strictly private, can now be used by the throwaway lobby to bring pressure on the other agencies that support the deposit measure.

The confidential minutes also note: "It is no secret that most of the people present would like to quash the beverage container guidelines completely."

As a result of the pressure that the industry had been able to mount behind the scenes, the EPA has now knocked out of the guidelines the recommendation calling for state and local governments to join in the battle against throwaways.

Footnote: Hickman explained that he and Colonna had merely meant to get the objections of the industry so that the final guidelines would need fewer changes. There was no intent to favor industry, he said, nor was it illegal to give them the documents.

Fighting Congressmen—With flying fists and feet, half a dozen members of Congress will battle for the karate championships of Capitol Hill on Sept. 14 at Washinton's D.C. Armory.

The Senate will put up Quentin Burdick (D-N.D.) vs. Ted Stevens (R-Alaska). Burdick has been trimming down for the bout, and Stevens has been receiving daily private lessons from karate master Jhoon Rhee.

From the House side, Tom Bevill (D-Ala.), will fight Floyd Spence (R-S.C.), and Walter Fauntroy (D-D.C.), will square off against Willis D. Gradison Jr. (R-Ohio). The proceeds will go to a legal defense fund to help investigative reporters.

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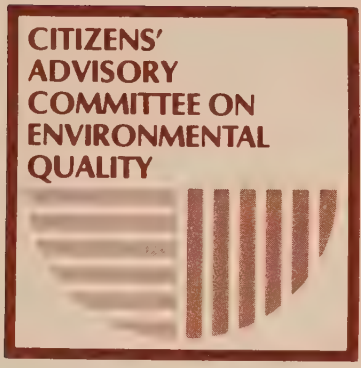

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Henry L. Diamond
Chairman

ENERGY IN SOLID WASTE

A CITIZEN GUIDE TO SAVING

CITIZENS' ADVISORY COMMITTEE ON ENVIRONMENTAL QUALITY

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INTRODUCTION

Although the current energy crisis is causing hardship for some and inconvenience for many, it is also the source of an unprecedented opportunity—an opportunity which, if we are wise enough to seize it, could be of lasting benefit to all Americans. Through its impact on our daily lives, the shortage of energy is dramatic evidence that our physical resources are not unlimited. It should convince us that we can no longer afford or tolerate the prodigal waste or the "throw-away" philosophy that has increasingly pervaded our living patterns during the three decades since World War II.

Let us not for a moment think that only our energy supplies are limited. The resources of the earth are *all* finite. Yet, we waste prodigious amounts of food, fiber, and minerals with little regard for the future "crises" that could come upon us as quickly as the energy crisis.

We must move toward a conservation ethic in every facet of our society and our economy. This will require reconsideration and restructuring of many traditional values. There is no better place to begin than literally at our doorstep—through the recovery, recycling, and reuse of the valuable resources we now discard as "solid waste."

In 1971 we conducted a special study of this subject and, in our 1972 ANNUAL REPORT TO THE PRESIDENT AND TO THE COUNCIL ON ENVIRONMENTAL QUALITY, made recommendations for more effective administrative and Congressional actions to improve resource recovery, recycling, and reuse of our solid waste. Solid waste is still running a poor third to our national commitments for solving air and water quality problems. Less than 2 percent of the Environmental Protection Agency's budget is devoted to solid waste, and only at the local government level is it given the attention it must have.

Yet, solid waste, as with our energy situation a year ago, is a "crisis around the corner." Our garbage and trash are piling up faster than we can find satisfactory places to put them. The National League of Cities reports that almost half of our cities will run out of current disposal capacity in from one to five years. Even where capacity still exists, open dumping continues to be the dominant method of disposal. This situation poses severe sanitary and environmental problems.

Equally disturbing is the fact that this garbage and trash represent a tremendous waste of energy and other scarce resources that we no longer can afford to squander. Even though our recent oil and gasoline shortages have been eased—at least temporarily—we cannot afford to relax conservation practices. Our limited supplies of nonrenewable resources are still being depleted rapidly. In addition to oil, we already are heavily dependent on imports for newsprint, aluminum, and tin—all items that now get thrown away. Moreover, the energy in our solid waste is and will continue to be a resource we no longer should bury, burn wastefully, dump in the ocean, or broadcast as litter across our landscape.

In attacking this problem, citizen action can make a substantial contribu-

tion. Individually and collectively, citizens can reduce the amount of waste at home, at work, and at play. They also can do much to facilitate the recovery, recycling, and reuse of the resources now being wasted. Furthermore, they can insist on appropriate government attention and action in setting examples for others to follow.

This report is designed to stimulate and guide these efforts. It is in the Committee's tradition of encouraging citizen action and helping to make it more effective by providing basic informational tools. It does not attempt to cover all the issues of solid waste management. Rather, it puts primary emphasis on citizen practices that can be initiated readily and rapidly in and around the household to reduce solid waste and to conserve the energy involved. In addition, it urges basic and long-range changes in wasteful life-style patterns that now prevail. Recognizing that citizen action alone cannot resolve all of the solid waste problems, it also points out the need for a broad-gauge national solid waste policy and commitment to it by all levels of government and the private sector.

There is great potential for a multiplier effect here. By reducing unnecessary consumption and by increasing our resource recovery, recycling, and reuse, we can help bring our energy supply and demand into better balance; we can conserve our diminishing natural resources; we can reduce land use requirements for waste disposal; and we can minimize other adverse impacts on the quality of the environment that we all must live with henceforth—a huge environmental payoff for a modest investment.

Henry L. Diamond
Chairman

CHAPTER I: A NATIONAL OVERVIEW

Somewhere along the line, too many Americans lost the pioneer ethic of "waste not, want not." Today, largely because we have forsaken frugality for a carefree abandon born of affluence, the abundance of materials—and of their packaging —is taken for granted, discarded casually, and forgotten as soon as the garbage and trash are removed from the doorstep.

The amount of this waste is enormous. According to the most recent studies by the Environmental Protection Agency (EPA), the total municipal waste collection for 1971 was 125 million tons per year or 3.2 pounds per person per day. These figures include wastes generated in the household, commercial establishments, and institutions like schools and hospitals. Although it excludes industrial, agricultural, animal, and mineral wastes, the total amount that ends up in the "National Trash Can" is tremendous (see Figure 1).

Not only is the total volume staggering, but it also represents an inexcusable waste of money and energy. The costs of the nation's collection and disposal of residential and commercial wastes are rising dramatically, and EPA estimates that—unless current practices are modified—these costs will soar upward from $2.6 billion in 1971 to $3.7 billion in 1980 and $4.4 billion by 1985.

The waste of energy represented by solid waste is equally depressing. For instance, let's look at the National Trash Can. Significantly, 80 percent of these materials (99.1 million tons) are combustible, have low sulphur content, and could be burned as fuel without significant odor or smoke. In fact, according to the latest available information developed by EPA, the approximate heat value of this portion is 5,500 Btu's per pound. Nationally, the 99 million tons of combustibles theoretically represent about one quadrillion Btu's of energy—equivalent to 8 billion gallons of gasoline, 7.3 billion gallons of No. 2 fuel oil, or 178 million barrels of crude oil. If the current estimates of our recent domestic petroleum shortfall (about 730 million barrels per year) are valid, an equivalent of about 24 percent of that shortfall amount is now being buried or wastefully burned.

The foregoing comparisons, of course, are hypothetical, and it is unrealistic to assume that *all* of our combustible residential and commercial waste could be burned as fuel. Nor should it, necessarily. Much of our waste paper, for instance, can and should be recycled rather than burned.

Paper—Burning Versus Recycling

According to the EPA SECOND REPORT TO CONGRESS ON RESOURCE RECOVERY AND SOURCE REDUCTION in March, 1974, about 70 percent of paper in municipal solid waste is mixed and/or contaminated and is thus difficult to separate out. The other 30 percent of the waste paper, though, consists of writing stock, data cards, corregated cardboard, and newspapers. These are relatively easy to sort out, and there are good reasons to do so.

Paper is the most important communications medium, the most widely used packaging material, and an important component of construction and industrial products. Its use in our modern society has increased so dramatically that paper (particularly newsprint) is in short supply. Because of strikes at Canadian newsprint mills, imports have not been readily available to satisfy demands. Ironically, even though the demand for recycled paper exceeds supply, the percentage of paper being recycled decreased between 1950 and the early 1970's.

These alone are sufficiently valid reasons for recycling paper rather than burning it as fuel. But there are other reasons also. From an environmental conservation point of view, there is a widely cited statistic that each ton of recycled paper saves 17 trees. If two-thirds of the trash paper could be separated out and recycled, 430 million trees would be saved each year.

From an energy conservation point of view, the Midwest Research Institute reports that recycling of paper requires less than one-third of the fossil fuel energy needed to make paper from primary resources. If, as EPA's Second Report to Congress indicates, it is technically possible to recover half of the 70 percent of the mixed waste paper, the recycling of this portion (13.7 million tons) plus the 11.7 million tons of the easily separable items could mean a fossil fuel energy savings equivalent to 2.4 billion gallons of gasoline per year. This exceeds the fuel energy equivalent of 2.2 billion gallons of gasoline that could be produced annually by burning the same amount of trash paper mixed in with other combustibles but from which the noncombustibles have been separated out. Thus, the recycling of paper — as opposed to burning — would produce a net energy benefit of about 200 million gallons of gasoline, enough to drive 270,000 cars 10,000 miles a year at a rate of 13.3 miles per gallon.

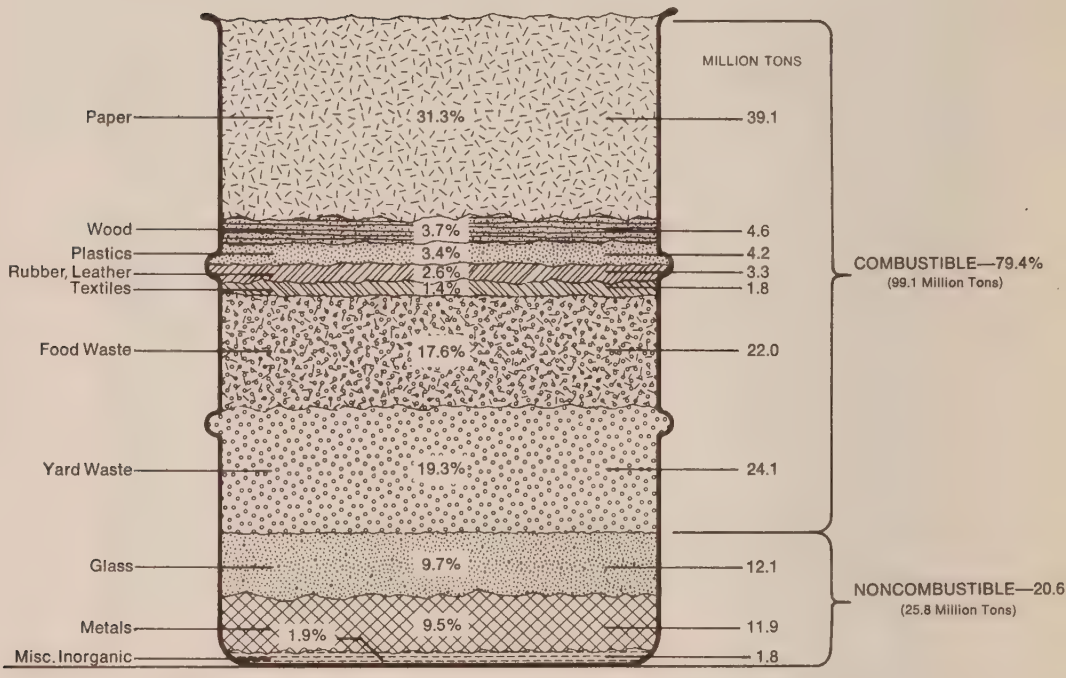
Plastics Need More Study

Waste plastics pose a paradox similar to that of waste paper. Like paper, waste plastics can be burned to produce heat energy; but, as with paper, the recycling of these materials can conserve valuable natural resources. There is, however, a major impediment to the recycling of plastics — once mixed in the municipal waste stream, the technology of separating, purifying, and upgrading the multitude of plastic varieties simply does not exist. Thus, because its heat value (11,000 Btu's per pound) is the highest of any component in the National Trash Can, the present consensus is to burn this plastic component as fuel. But, again as with paper, there are good reasons not to do so.

Plastics are made from a scarce natural resource — petroleum. Unlike the paper source, which is renewable, petroleum is not. Once gone, it is gone forever. Although the production of plastics now consumes only 1.5 percent of the petroleum used in this country, this production is increasing at the impressive rate of more than 10 percent per year. At this rate, present production, which uses a gasoline equivalent of 4 billion gallons per year, would increase to an equivalent of 8 billion gallons by 1980. To continue to rationalize the burning of waste plastics as fuel instead of recycling them is to foster rather than forestall the depletion of the world's currently most critical natural resource.

National Trash Can

(Annual Municipal Solid Waste—1971)



Source—Environmental Protection Agency. Second Report to Congress, Resource Recovery and Source Reduction, 1974.

FIGURE 1

Based on present knowledge, it is extremely difficult to determine how much of this petroleum consumption could be reduced by recycling instead of burning. Since feasible technology apparently does not exist to recover plastics mixed in the waste stream, an alternative is to segregate waste plastics at the household level for separate collection. Here too, though, there are problems. Because of the low-density factor of most discarded plastic items, collection trucks have to make more trips to obtain a favorable tonnage payoff. For this reason and because of the lack of recycle markets for mixed plastics, most recycle centers do not handle discarded plastic materials.

The latter point, however, may not necessarily be decisive. In New York City, where the Environmental Action Coalition operates 40 recycling centers, a manufacturer of plastic "slip sheets" offered to buy *all* of the mixed plastics

that the coalition could recover. His plan was to select out the suitable plastics and discard the remainder. To make the operation viable, he needed at least 100,000 pounds of mixed plastics per month, and the coalition recycle centers could collect only about 10 percent of that amount. Because he was unable to find any other economically suitable source of scrap plastic, the operation failed. In this case, the potential market apparently was there, but because the recycle centers previously had refused discarded plastics, these centers were unsuccessful in instituting the new procedure on a sufficient scale. This example indicates that more research is needed to find and develop similar markets. Once these are available, home separation of waste plastics and their collection could become economically feasible as well as desirable for conservation purposes.

Certainly, the potential conservation benefits warrant additional research into ways to recycle rather than burn these petroleum derivatives. For example, if at least 25 percent of the 4.2 million tons of plastics in the National Trash Can were separated out at the household level and collected separately for recycling, the petroleum used in plastic production could be reduced by about 9 million barrels, or a gasoline equivalent of about 400 million gallons per year. If the impediments to such recycling are basically economic, the value of the diminishing critical resource may even warrant public subsidy of the recycling process.

Energy in Our Noncombustible Trash

The energy that could be saved by recycling some of the nonburnable trash components is equally impressive. According to the National Commission on Materials Policy, recycled aluminum requires less than 3 percent of the energy needed to produce aluminum from bauxite ore. Recycled steel requires less than half of the energy needed to produce steel from virgin ore. When it is assumed that about 70 percent of the aluminum and 90 percent of the steel in the 1971 National Trash Can could be recovered, these factors translate to a potential recycling energy equivalent saving of 226.5 trillion Btu's or 1.8 billion gallons of gasoline — enough to make nearly 7 million one-way car trips per year from New York to San Francisco on a basis of 13.3 miles per gallon.

The Case for Glass

In terms of energy conservation, the case for the recycling of glass is less favorable. This is mainly because more energy is often required to sort out the glass from mixed trash in many scattered locations than to extract raw materials from a single location. According to EPA's first report to Congress, (dated February 22, 1973), the energy needed to produce recycled glass versus the manufacture from glass sand varies from 3 percent more energy needed for recycling to 6 percent less, depending on the recovery system for obtaining the cullet (reclaimed glass). Based on more recent figures, EPA now estimates a glass recycle savings of about 2.5 million Btu's per ton when at least 50 percent cullet is used in making new glass. Annually, this amounts to about 21 trillion Btu's — an energy equivalent of about 170 million gallons of gasoline.

Although the net energy result is considerably less than for steel or aluminum, recycled glass still has considerable value as a needed component in glass manufacture, and it can be used in road paving, construction bricks, and building panels.

Recycling alone, however, is only a part of the energy potential of reusing glass. The big energy potential of glass is its reusability in the form of a returnable bottle vis-a-vis the disposable beverage containers now so prevalent and causing so much of the solid waste disposal and litter problem. In 1972, 54 billion throwaway containers were used in the United States. On an average, each of these consumes 4,198 more Btu's of energy than does each usage of a 10-trip returnable glass container. Nationally, if glass returnable bottles were used instead of throwaways, the energy saving would be about 225 trillion Btu's or an equivalent of 1.8 billion gallons of gasoline. This would be enough to supply nearly 2½ million cars for a year.

The Energy in Our Litter

Not all of our urban waste ends up in the trash can. Entirely too much of it is strewn as litter along our highways, in picnic areas, and elsewhere across the landscape. The initial problem lies with the careless consumer who tosses an empty can or candy wrapper out the car window. It is aggravated by a production system that stimulates exorbitant waste by excessive packaging, by policies of rapid obsolescence of products, and by methods that result in goods that cost less to replace than to repair, retain, or recycle. In any event, the results are monstrous. From information compiled under the auspices of Keep America Beautiful, it can be estimated that our wayside waste amounts to as much as 4 million tons per year. Thirty-five percent of this consists of disposable bottles and cans; 50 percent is paper-based; and 15 percent is plastics, rubber, and other combustibles. The most obvious result is an environmental eyesore which costs us, the public, as least $200 million a year to collect and dispose of—an unfortunate but necessary diversion of manpower, money, and energy.

Here again, the energy component of this landscape litter is significant. The energy factors related to disposable beverage containers and paper products have already been discussed. Automobile tires, which are particularly combustible, are worthy of special mention. Approximately 200 million tires—almost a tire per person—are discarded each year. Although all of these are not discarded along the roadside, tires do represent at least 3 percent of the items scattered there as litter. As such, they are particularly obnoxious because they do not deteriorate and their bulky unsightliness is a lasting eyesore. Even when collected, they are a disposal problem because they do not settle easily into landfills, and they produce acrid black smoke when burned in the open air. If burned as fuel under the proper conditions, each tire has a 260,000 Btu value, equivalent to about 2 gallons of gasoline.

The Total Energy Potential

In the foregoing we have indicated examples of energy factors in both the National Trash Can and the litter strewn across our countryside. Individually,

these statistics are impressive. The cumulative totals, as shown in Figure 2, are even more so.

In addition to the 1,397 trillion Btu's of potential energy in the National Trash Can and wayside litter, 225 trillion Btu's of energy could be saved by using returnable, reusable bottles instead of throwaway cans and bottles. This latter energy factor, though, is not completely additive. If throwaway beverage containers were eliminated, the potential recycle energy factor of steel must be reduced by 26 trillion Btu's, aluminum by 53 trillion Btu's and glass by 10 trillion Btu's. The net result then would be about 1,307 trillion Btu's of potential energy in municipal waste and litter plus 225 trillion Btu's saved by using returnable bottles — a total of 1,532 trillion Btu's of potential energy. This is equivalent to 12.3 billion gallons of gasoline or about one-sixth of the amount of gasoline used in 1972 by the more than 100 million privately owned registered cars in the United States.

Energy in National Trash Can (NTC) and Countryside Litter (1971)

COMPONENTS	National Total (million tons)	Btu's (trillions)	Gasoline Equivalent (million gal.)
Combustibles in NTC (as fuel)	73.7[1]	810.7	6,486
Combustibles in litter (as fuel)	2.5	27.5	156
Recycle 65% of paper in NTC	25.4	304.8	2,438
Recycle 90% of ferrous metals in NTC	9.5	114.5	916
Recycle ferrous littered cans	0.2	1.9	15
Recycle 70% of aluminum in NTC	0.5	112.0	896
Recycle aluminum in littered cans	0.02	3.7	30
Recycle 70% of glass in NTC	12.1	21.2	170
Recycle glass in littered bottles	.28	0.7	6
TOTAL	124.2	1,397.0	11,113

[1]*Minus 25.4 million tons of paper*

FIGURE 2

Other Important Environmental Benefits

The saving of energy, although certainly important, is not the only benefit that can be gained from recovery and reuse of our solid waste. For example, the recovery and reuse of a material obviously conserves the natural resources and the landscape from which that material is derived. This aspect becomes particularly important as the efforts toward national self-reliance pose threats of more strip mining and its degradation of our landscape.

Recycling and reuse of materials also eliminates the need to find places to dump or bury them. Pilot projects sponsored by EPA at Franklin, Ohio and St. Louis, Missouri, for instance, reduce the volume of waste disposal to 5 percent of that collected; they recover up to 25 percent of material content for reuse; and they produce a fuel energy equivalent of up to 80,000 gallons of gasoline per 1,000 tons of refuse input. The more advanced pyrolysis (burning with reduced oxygen) processes sponsored by EPA and being developed at San Diego, California, and Baltimore, Maryland, do an even more thorough job. The pyrolysis processes that produce a heating oil reduce the volume of wastes to less than 10 percent, and those that produce a heating gas leave little that has to be carted away to a dump or land fill.

In addition to the above, recycling produces other distinct environmental benefits. The substitution of waste materials for virgin materials in manufacturing systems also results in decreased air and water effluents. In its 1973 Report to Congress, EPA cited studies that compared recycling versus manufacture from virgin sources for glass, paper, and steel — the principal recovery components of solid waste. The results indicate that in most cases studied, the atmosphere effluents, waterborne wastes, solid wastes, and water consumption (as well as energy demands) are substantially lower for resource recovery as compared to virgin material utilization.

What Can Be Done?

The present systems of burying or burning our waste, although expedient, cannot continue much longer. We truly and rapidly are running out of acceptable sites for the former, and the air pollution resulting from many current incineration operations is unacceptable.

Basically, then, there are three feasible strategies to consider:

(1) Source reduction — voluntary and/or compulsory actions by both producers and consumers.

(2) Source separation — voluntary and/or compulsory actions at the household or commercial source to facilitate recovery and reuse.

(3) Waste processing — the application of emerging technological processes that maximize the recovery of materials and energy.

These strategies, of course, are not mutually exclusive. It is not a matter of choosing any one instead of the others, because each strategy is necessary to some degree. Although source reduction and source separation reduce the problems of collections and disposal, some form of waste processing is still needed.

As indicated, several technological processes for materials recovery and/or fuel conversions are emerging. Some of these show promise as ultimate answers to municipal solid waste disposal. Yet, most of these are still in the demonstration stage, and few full-scale recovery plants exist. Recovery by these methods should be attractive mainly in areas where high disposal costs prevail and local markets for the recovered materials exist.

The current economic differentials, though, are subject to change. As easily accessible disposal sites become scarcer and force transportation over greater distances, the costs of disposal will rise. As basic material resources are becoming increasingly scarce and expensive to exploit, this is helping to close the economic gap. Finally, and most emphatically, energy already *is* scarce, and its cost *is* rising rapidly, making recovery systems more economical as well as imperative.

Nevertheless, even with materials processing systems becoming economically feasible as well as environmentally necessary, it will take several years to install these systems and bring them "on line" in all regions of the country. In the meantime, the solid waste stream will continue to increase and overflow available disposal sites—unless *we* reduce the amount of that flow.

Experience has shown that informed and thoughtful citizens will take it upon themselves to do what is needed in times of existing or impending crises. The energy emergency is here, and as Environmental Protection Agency Administrator Russell Train has pointed out, it is a situation brought on by the excessively wasteful lifestyle of our society. Since our society is all of us, we are the ones who can modify it.

The following chapters are designed to show how we — in the home, at work, and at play — can modify our wasteful ways.

CHAPTER II: CITIZEN ACTION BEGINS IN THE HOME

In discussing energy in our solid waste, we have concentrated on two principal categories — municipal waste (National Trash Can) and countryside litter. These two categories are the most offensive and the most dangerous to health when accumulated in and near population centers. They are the categories that are increasing most rapidly and thus posing the greatest problems of disposal. Moreover, these categories are the parts of our national waste to which individual citizens can most readily relate and can most effectively modify.

In order to determine what citizens can do in the home, we need to look at the National Trash Can again. This time we need to look not only at the materials in it but at the product source categories as well (see Figure 3).

From this breakdown we see that about 80 percent is derived from market-product sources (as opposed to yard and garden-type wastes). Excluding food wastes, market-product sources account for about 60 percent of the waste flow. It is to this 75 to 80 million-ton portion that product source reduction and material recycling programs can be principally directed.

There is one further step to take before measuring the recycling savings that can be accomplished in the home. EPA figures indicate that 72 percent of municipal waste (the National Trash Can) is generated in the home. After subtraction of that which is collected from commercial establishments and institutions, the home-generated components are shown in Figure 4. This figure also indicates the amount of each component accumulated annually in the average household and the hypothetical energy savings that could be accomplished by either recycling or burning these materials as fuel.

Figure 4A presents these results graphically. In the home "Recycle Center," materials which are feasible to separate and store for special collections are shown. The gasoline container beneath each material indicates the gasoline energy equivalent that could be saved by recycling these products in comparison to their manufacture from virgin resources.

In the "trash center" a stylized garbage can containing food and other waste materials which are not suitable for home separation is shown. The gasoline energy equivalent to be obtained by burning each component as fuel is shown in the related containers. Yard wastes are shown separately because they probably would be collected this way, or they could be converted to compost as a fertilizer substitute in place of the petroleum-derivative, commercial fertilizers now used in home gardens. The bulky waste items (furniture, appliances, etc.) are not illustrated, since most of these would be collected separately, and because of their variations in content, it is difficult to estimate their recycle values.

Now that we have seen the magnitude of the possibilities, we can investigate ways to save the energy by certain actions in the home. Most of these

The National Trash Can

(Residential, Commercial & Institutional by Material and Source, 1971)

KINDS OF MATERIALS	MATERIAL TOTALS		PRODUCT SOURCE CATEGORIES (million tons)						
	10^6 Tons	Percent	Newspapers, books, and magazines	Containers and Packaging	Major household appliances	Furniture and furnishings	Clothing and footware	Food products	Other products
PAPER	39.1	31.3	10.3	20.4	—	*	*	—	8.4
GLASS	12.1	9.7	—	11.1	*	*	—	—	1.0
METALS									
Ferrous	10.6	8.5	—	5.4	1.7	*	—	—	3.5
Aluminum	0.8	0.6	—	0.6	0.1	*	—	—	0.1
Other nonferrous	0.4	0.3	—	0.1	0.1	*	—	—	0.2
PLASTICS	4.2	3.4	*	2.5	0.1	0.1	0.2	—	1.3
RUBBER & LEATHER	3.3	2.6	—	*	0.1	*	0.5	—	2.7
TEXTILES	1.8	1.4	*	*	—	0.6	0.5	—	0.7
WOOD	4.6	3.7	—	1.8	—	2.3	*	—	0.5
FOOD WASTES	22.0	17.6	—	—	—	—	—	22.0	—
PRODUCT TOTALS	99.1	79.3	10.3	41.9	2.1	3.2	1.2	22.0	18.4
YARD WASTES	24.1	19.3							
MISC. INORGANICS	1.8	1.4							
TOTAL WASTE	125.0	100.0							

*trace

FIGURE 3

Annual Household Solid Waste and Recycle Energy Value

	National Totals (million tons)	Average Household Accumulations (pounds)	Annual Household Energy Savings Equivalent		
			Recycling (gal. of gasoline)		Burning (gal. of gasoline)
MATERIAL					
PAPER					
Newspapers	7.0	233	11.2	or	10.2
Other Separable	5.3	173	8.3	or	7.6
Nonseparable	10.9	370	—		16.3
GLASS	10.8	368	3.7		—
FERROUS METALS	6.3	210	10.1		—
ALUMINUM	.6	20	16.0		—
OTHER NONFERROUS	.2	7	—		—
PLASTICS					
Separable	1.0	33	4.9	or	2.9
Nonseparable	2.3	77	—		3.4
RUBBER & LEATHER	1.0	33	—		1.4
TEXTILES	1.0	33	—		1.4
WOOD	.6	20	—		.9
FOOD	17.8	593	—		26.1
MISC. INORGANIC	1.0	33	—		—
SUBTOTAL	65.9	2,203	54.2		70.2
BULKY MATERIALS	6.4	213	—		—
YARD WASTES	18.1	600	—		19.2
TOTAL	90.4	3,016	54.2		89.4

FIGURE 4

Household Refuse Collection Center

(Annual Accumulation—1971)

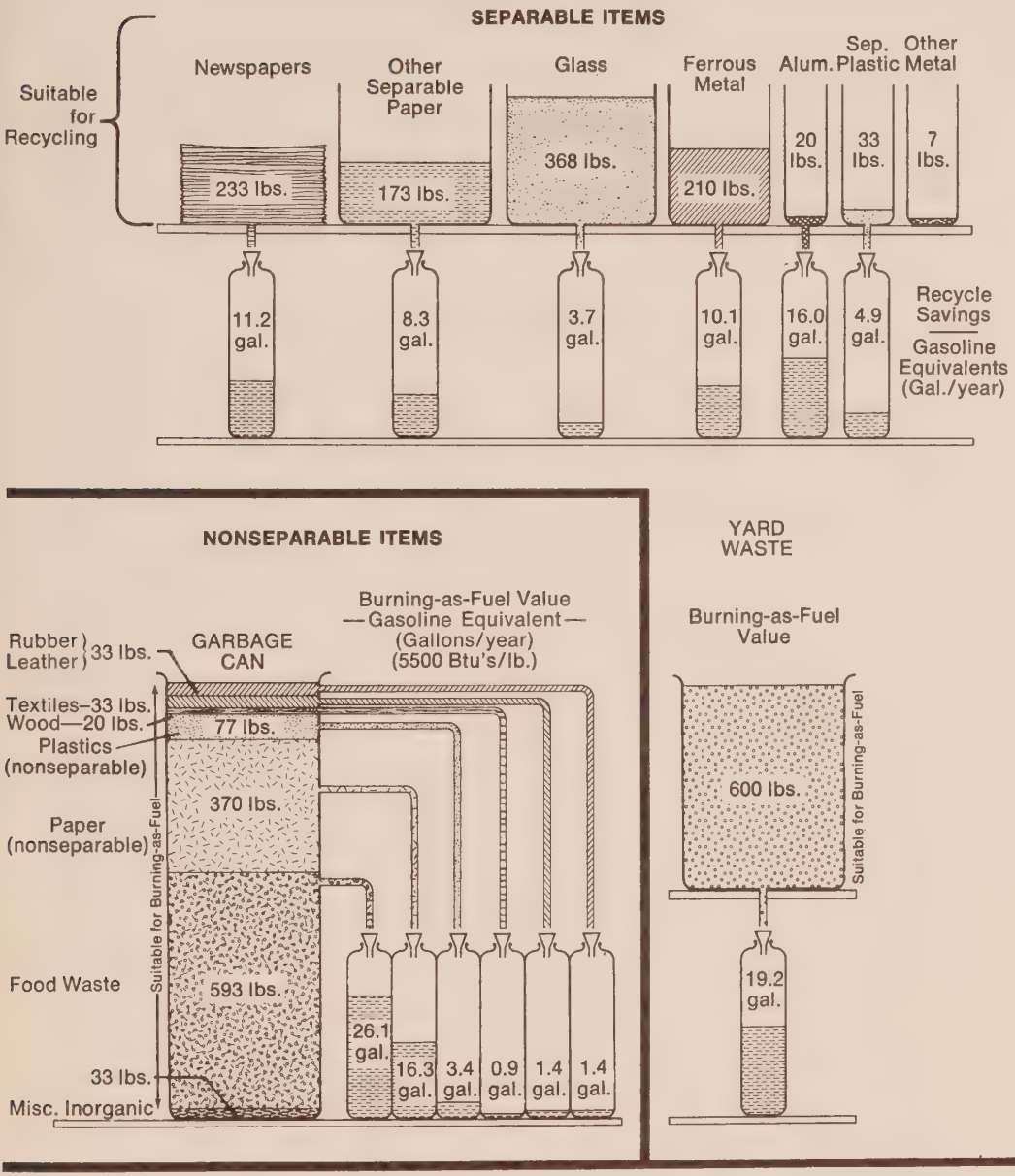


FIGURE 4A

actions can be taken readily and inexpensively, and they can be effective as short-range measures to cut down collection costs and the demands on dump sites. More importantly, these measures also make good sense in the long term, even for a future when technological processes are available for broad-scale reduction, recovery, recycling, and reuse.

Source Reduction

Source reduction involves changes in consumer consumption. When done voluntarily, it means more discriminate purchasing, more reuse of the products bought, and more thoughtful practices prior to the discard of used-up or throwaway materials.

An obvious and dramatic example of source reduction is the purchase of returnable instead of throwaway beverage containers. Effective action can start as soon as tomorrow's trip to the supermarket. The first step can be the purchase of a six-pack of soft drinks in returnable bottles instead of no-deposit, no-return containers. This action will reduce the size and weight of next week's trash; it will save an energy equivalent of 1½ pints of gasoline; and when the 30-cent deposit is returned during next week's shopping trip, the six-pack purchase will have cost 18 cents less than for throwaways. In terms of today's rapidly rising grocery costs, any such savings is prudent. With gasoline shortages, the saving of 1½ pints of gasoline that can take the family car 2½ miles is substantial. Since throwaway beverage containers now constitute 7 percent of municipal waste, elimination of this component will be meaningful in reducing trash collection and disposal problems. Moreover, less roadside litter is one of the principal benefits of source reduction through the use of returnable bottles instead of throwaway containers. This was the principal objective of the Oregon bottle bill, and it was effective almost immediately — eliminating at least two-thirds of the beverage container litter and at least 10 percent of all roadside litter in Oregon the first year.

Other examples of source reduction, waste-saving actions include: the purchase and reuse of cloth towels instead of paper ones; the purchase of toothpaste in tubes without superfluous cardboard boxes; elimination of extra bags and boxes by using and reusing a strong paper bag or a canvas tote bag to carry home groceries and other purchases. A check list of these and other suggested reduction tactics is included at the end of this booklet.

Source Separation

In the home, source separation means the segregation of solid waste into categories that can be recovered before they enter the waste stream. The separation of newspapers for the recovery of paper fiber is an obvious and substantial example. Newspapers now represent about 8 percent of municipal waste, and a recent study in five New Jersey communities indicates that the average household accumulates about 6 pounds of newspapers per week. By separating out all these papers for recycling, each housewife can save an energy equivalent of 14.9 gallons of gasoline per year and save more than two pulpwood trees from harvest each year.

Similar actions to separate out cardboard, glass, aluminum, tin cans, and ferrous metals also can facilitate recycling operations. Metal coat hangers (currently in short supply) can be collected and returned to the cleaners. Outmoded clothing, toys, china, appliances, and furniture can be donated to charities for reuse. Again, these are but a few of the actions that can be taken with a minimum of effort and that can avoid unnecessary energy waste.

Inhibitors to Householder Action

The foregoing actions to reduce waste and separate out recyclable materials all sound so simple that the question readily arises as to why they are not being done now. After all, waste reduction in the home and along the highway appears to be largely a matter of thoughtful restraint. Separation of certain home waste items also is relatively easy. But the answer is not quite that simple.

Again, let's consider the beverage container situation. Today's manufacturing and merchandising practices favor the throwaways, and we the consumers have become conditioned to their convenience. Proof of this lies in the accompanying charts (Figures 5 and 6), showing the dramatic switch from 1955 to 1969 and projected trends to 1976. Even now, in 1974, it has become difficult and often impossible to find preferred brands in returnable bottles on the grocery or supermarket shelves.

This situation, of course, is not accidental. Most manufacturers prefer the one-way containers which are lighter in weight and thus reduce handling problems and shipment costs; disposables avoid the collection and cleanup operations associated with reusable containers; and the beverage companies don't have to worry about the inspection and discard of chipped or broken bottles. Merchandisers share many of these same opinions, and many supermarket operators would be glad to see returnable bottles disappear entirely. As a result, manufacturers, distributors, and retail dealers strenuously oppose legislation like the Oregon "bottle bill" that requires a deposit on all beverage containers sold in the state and also bans the dangerous and nondegradable "flip-top" cans. Opponents of this type of legislation refer to increased consumer inconvenience and cost, and they foster the recycling of aluminum, steel, and glass as better and less expensive ways of reducing litter and solid waste. They also claim that obliteration of throwaway containers will put some companies out of business and result in the loss of jobs. Moreover, they say bottle bills will hurt small independent operators more than they will big companies which can better afford the large capital costs of machinery to process returnable bottles or to switch emphasis to other products and processes.

Nevertheless, there is irrefutable evidence that Oregon's bottle bill has resulted in substantial reduction in the vital areas of litter, solid waste, and energy consumption.

This leaves capital costs of adjustments and potential job losses in the disposable container industry as the principal arguments against any measure restricting throwaway containers. As to the job issue, various studies show widely different results — from one study that predicted the nationwide loss of

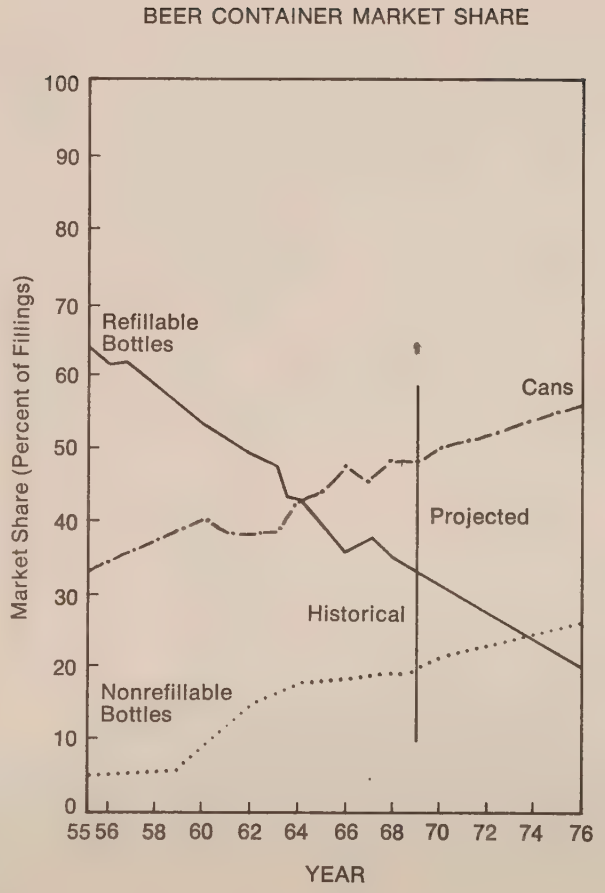


FIGURE 5

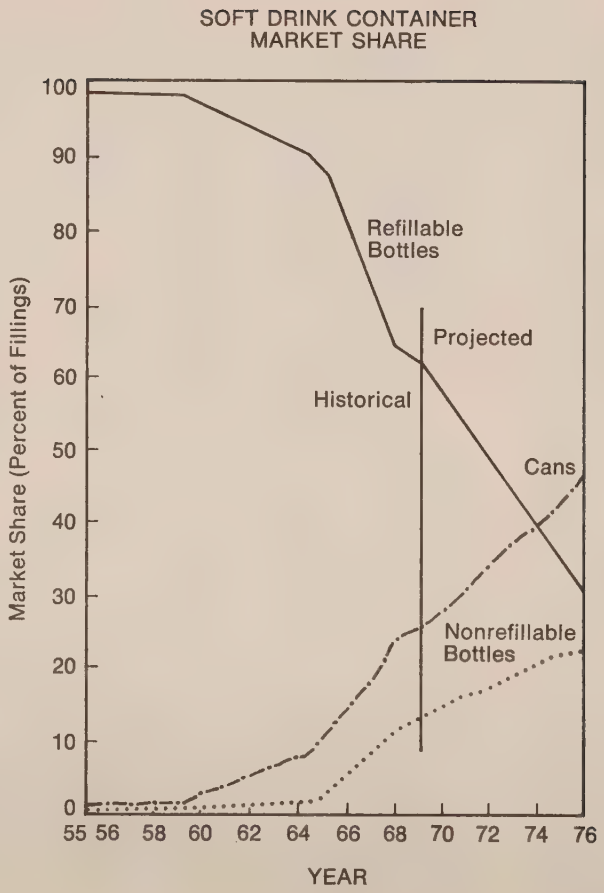


FIGURE 6

(Historical data from: Glass Containers Manufacturers Institute, and the Can Manufacturers Institute; projections by Research Triangle Institute.)

164,000 jobs to other studies that estimate a 130,000 job gain in the retail and distribution trades. Clearly, the issue of future job impacts needs closer examination. It is strange, though, that there was not an equal concern for the earlier job losses in the bottling, brewing, and supermarket business as a result of the market trends shown in Figures 5 and 6. EPA is conducting studies on how to reduce economic impact, considering such factors as (1) time-phasing of the conversion to returnable containers and (2) direct compensation of displaced workers where the impacts are severe.

Even with the job effect somewhat uncertain, it is clear that the housewife is now restricted from making the open choice of using returnable bottles as a means of reducing waste and energy consumption. Legislative mandates like the Oregon bill, of course, can change this — but such actions take time to accomplish. More immediate results can be instigated by consumer demands on the supplier. After all, if the marketplace still functions on the principle that "the customer is right," then we have the ideal arena for citizen action to make the difference.

Some claim that the average homemaker won't often take overt action and that when he or she does, it is not apt to be sustained for long. We find it hard to concur with a "put-down" like this, particularly if there is a cause célèbre — a national crisis or an impending crisis that threatens the homemaker's family or way of life. To check on this, EPA conducted a study in 1972, "Metropolitan Housewives' Attitudes Toward Solid Waste." One of the major findings stated:

> "Despite their concern about the solid waste problem and their expressed desire to do something about it, few housewives have taken any direct action in the past. Those who have done so have cooperated only minimally. *The root of the problem appears to lie in the lack of authority to reinforce positive attitudes and to channel current and future efforts.*"

Therein lies the basic issue — individual and collective apathy and inaction. These are the problems that this citizen action guide is designed to overcome. We hope this booklet itself will convince individual homemakers to instigate the suggested actions and to continue them as part of the normal household routine. One way that this can be accomplished is through citizen and neighborhood leaders who can provide the needed encouragement and direction to concerned but indecisive individuals.

Voluntary Action May Not Be Enough

Voluntary action, of course, is best. No on likes to be regulated or taxed. Moreover, the systems doing so tend to become so bureaucratic, cumbersome, and expensive that the ends may get lost in the means. Nevertheless, where voluntary actions are insufficient to protect the public interest, mandates become necessary. In dealing with solid waste problems, some states and localities already have found this to be the case. Oregon, Vermont, South Dakota, and certain counties elsewhere have instituted bottle bills. Similarly, several communities have passed ordinances that require the separation at

their source of such items as newsprint, corrugated cardboard, glass, and some metals. Other mandatory measures not yet invoked can be aimed directly at product manufacturers — setting standards to limit the amount and types of packaging and counteracting planned obsolescence by requiring that products have a certain length of useful lives.

Ultimately, some mandates may be necessary to reinforce or supplement voluntary actions. These, too, take time to institute. So we come back to the basic premise — the fastest way to get something done is to do it ourselves. The check list at the end of this booklet provides a guide for such actions. These, in turn, may suggest others.

Other Actions in the Community

Although citizen action to reduce solid waste and its energy component should and must begin in the home, it should not be limited to that realm. To be fully effective, the "waste not, want not" ethic must be extended to every facet of community life.

There are many places where this can be done. EPA studies show that in 1971, 28 percent of municipal waste was generated in wholesale and retail outlets, offices, hotels, restaurants, and institutions like hospitals and schools. Since these are the places where the community residents work, they are logical places where citizen action can be extended and be effective in abating solid waste.

Here again, paper may be the easiest material to separate out of the waste stream. In the commercial-institutional sector, paper and paper products constitute nearly half of the waste generated. This ratio varies widely from banks and offices, where the trash is almost entirely paper content, to hospitals and restaurant waste, where pure paper products are relatively minor. Yet, in almost all such places, a considerable amount of paper can be diverted for recycling.

Banks and offices are prime examples. The Bank of America, for instance, reported in 1971 that it had been able to segregate and recycle nearly 25 million remittance envelopes, most of its outdated records, and all of the 132 tons of wastepaper produced by its Los Angeles data processing center as well as approximately 120 tons of tab cards and computer ledgers generated by its San Francisco center. In addition, the bank is completing the cycle by increasing its use of recycled paper in its normal bank operations. Other banks and offices have taken similar actions, but many still have not. It is in this latter group that citizens — as customers, workers, and officials — can be effective in promoting the separation and recycling of paper and encouraging the greater use of recycled paper in carrying out various business functions.

Retail stores also are prime targets. Grocery and liquor stores, in particular, discard a large amount of cardboard packing boxes and other paper-content materials that can be readily separated for recycling. Much of this already is being done, and a lot of the discarded cardboard boxes are being reused by our mobile society for the packing and shipment of household goods. But most grocery stores, particularly supermarkets, can do much more to reduce solid waste and the energy involved. Their role in the returnable versus throwaway bottles has already been discussed. In addition, store owners can be effective in passing on customer complaints about excessive packaging to

the manufacturing industries. Likewise, any large grocery chain can be particularly effective in encouraging the increased use of recycled paper in the products it sells.

Department and clothing stores and other retail establishments also should be encouraged to take similar actions to reduce the volume of the municipal waste stream. Restaurants and hotels, of course, generate a high percentage of food and other waste that is so mixed and contaminated as to prevent reasonable separation at the source. Here too, though, there are possibilities for the separation and recycling of shipping cartons and empty food containers, both metal and glass.

Hospitals produce unique problems of contaminated waste, much of which can best be burned and has a high fuel value. In addition, though, hospitals and medical centers also use many "disposable" plastic syringes and pill dispensers, and other products which could be replaced by reusable materials at a considerable savings in money, materials, and energy. Citizen inquiries and suggestions can be effective in getting these things done.

In any community, company owners and industrial executives play the dual role of citizens and citizen leaders. By carrying out recycle practices in their homes, they can set examples that their neighbors and others will emulate. By extending these and other conservation practices into their places of business, these managers can be particularly influential in stimulating their employees to similar efforts — at work and in their homes.

The litter problem is the most susceptible arena for effective citizen action. The act of littering is, after all, purely a matter of ethics. As such, it is a logical extension of home behavior. If through this publication and other anti-litter promotional efforts, we might instill thoughtful restraint and the "waste not, want not" ethic on a universal basis, there would be much less litter scattered along the highway and across our landscape.

Unfortunately, mere appeals to the public conscience are never universally accepted or fully effective. Neither are public regulations, and anti-litter laws are noteworthy examples of failure because of the enforcement difficulties. Even bottle bills that combine regulation and economic incentives will not eliminate *all* litter. The most effective answer, then, may be to adopt a national strategy that includes the best aspects of all three methods — persuasion, regulation, and economic incentives.

Citizen action can make the difference in the instigation and success of each method. The citizen role in establishing regulations and economic incentives will be discussed in the following chapters.

CHAPTER III: TOWARD A NATIONAL POLICY

Citizen action, of course, is essential in both solid waste and energy conservation. To be fully effective, these efforts need to be combined with and supported by a national program in which federal, state, and local governments and private industry all assume major responsibilities. Any such program must be based on adoption of a national policy that assigns the various responsibilities and assures that they will be carried out.

The reasons for such a national policy have been dramatized during this past year. In the *absence* of a strong national energy policy that would have prepared us for an oil import embargo, energy suddenly became a national crisis in late 1973. In that situation, impromptu citizen actions combined with a mild winter to avert any national disasters. But we would need a clear national policy to cope with another embargo on oil or other scarce natural resources.

In the realm of solid waste, critical disposal problems will probably occur on a city-by-city basis rather than on a nationwide basis like the oil shortages that affected all of us at the same time. Nevertheless, with half of our cities facing a shortage of disposal sites within five years, a strong national policy is needed to coordinate government and industry capabilities to cope with these situations. Sound national policies and programs are not developed overnight, nor should they be. But we need to be sure that we are moving in that direction and that we are taking the right approach. Hence, we need to review the status of present efforts in order to see what still needs to be done.

Local Government—The Front Lines

Not surprisingly, municipal government is shouldering the brunt of the solid waste problem — and the financing of it. In 1973 the National League of Cities and Conference of Mayors reported that it cost municipal governments $6.4 billion to collect and dispose of their garbage and trash.

Collection constitutes 70 to 80 percent of this cost. It involves more than 300,000 public and private personnel and 100,000 compactor trucks which consume an estimated 287 million gallons of gasoline and 163 million gallons of diesel fuel per year.

The disposal problem, although less expensive, is much more critical. In 1970 there were some 16,000 authorized disposal sites, only about 5 percent of which were operated on an acceptable sanitary landfill basis. As a result of EPA's "Mission 5,000" (jointly sponsored by 30 other organizations), 5,500 open dumps have been closed, but unfortunately, an equal number of new ones have been opened up. Currently, the Conference of Mayors reports that half our cities will be running out of suitable solid waste sites within five years.

In response to these problems, several substantial actions have been taken. But these are scattered and fragmented and have only scratched the surface of the overall problem. To reduce the problems and cost of collection, several communities now require curbside collections as well as requiring householders to separate certain items, such as newspapers, before collection. In addition to the states of Oregon, Vermont, and South Dakota, a few counties have enacted laws requiring refundable beverage containers; and other local governments are considering comparable actions. With technical assistance from EPA, many communities have reduced collection costs through increased efficiency. In Portland, Maine, redesigned collection routes saved $23,000 a year and at the same time provided additional service. Efficiencies that reduce truck mileage, of course, conserve gasoline. It has been estimated that by cutting twice-weekly collections to one and through improved vehicle routing procedures, there could be a nationwide annual savings of 18.2 million gallons of fuel oil and 39 million gallons of gasoline.

On the disposal end, some inroads are also being made. The city of New Orleans and the National Center for Resource Recovery are developing a program for the recovery and marketing of reusable materials from the city's trash and garbage. Based on an EPA-assisted demonstration project in St. Louis, 20 other major cities are considering or are committed to using solid waste as auxiliary fuel to generate electricity.

As stated above, these examples are the exception rather than the rule. But they do point in the right direction, and they indicate the advantages to be gained by nationwide application. Any methods of source and collection reduction have long-range as well as short-range benefits. But when it comes to the installation of broad-scale recycling process technology that now exists, most local governments, even when supported by substantial citizen action, cannot do the whole job.

With considerable justification, the Conference of Mayors and the National League of Cities contend that the following federal actions are imperative:

- Solid waste policy must be related to the larger policy issue of total resource conservation.
- Federal solid waste legislation should establish the goals and the programs to reduce refuse growth and achieve maximum feasible recovery of resources.
- Support for solid waste programs at all levels of government should be given a higher priority.
- Federal programs for resource conservation should include financial assistance for providing solid waste disposal and resource recovery facilities to meet the requirements of established environmental standards.

State Government—The Pivotal Role

Nearly all states have adopted, or are now developing, a statewide or interstate regional plan for managing solid wastes in ways that will avoid

environmental damage. Many states have passed laws banning open burning or dumping. Clearly, these are appropriate state roles, and they should be encouraged to pursue them more aggressively.

The most comprehensive action to date has been Connecticut's adoption of a statewide solid waste management plan recommended in a report prepared by the General Electric Company in cooperation with the state's department of Environmental Protection. Significantly, this report concludes that energy is the most valuable single commodity in the waste stream. This report also presents a concise and graphic state-of-the-art analysis of the various emerging technological processes for recovering and conserving solid waste energy. Other states, regions, and communities could benefit from reviewing this analysis.

Significant statewide attacks also have been launched against litter. As previously discussed, Oregon enacted its bottle bill in June, 1971. Vermont followed this action about a year later, South Dakota also has passed one, and since then similar legislation has been introduced in 30 other states. Although such regulation is a proper role of state government, many feel that federal legislation is also needed because of the interstate ramifications of the beverage business.

The Federal Government—Its Present and Future Role

Today, as in the past, the federal government's role is restricted mainly to providing funds for research and development, grants and contracts for training personnel, and grants for the demonstration of new or improved disposal methods aimed at resource recovery. State governments have been responsible for regulation and oversight, and local government has traditionally been responsible for collection and disposal. Although the Citizens' Advisory Committee on Environmental Quality agrees that this division of responsibility is basically correct, we do not feel that the levels of effort in meeting these obligations have been equitable. In the past, funds available for work on the solid waste problem have been pitifully small in view of the obvious needs. Now, in view of the energy and other resource shortages, it is becoming even more important that the federal government assist the state and local governments in establishing systems to recover these resources to the fullest extent possible.

Since 1965, when solid waste first received national recognition, the research sponsored by the Council on Environmental Quality, the Environmental Protection Agency, the Bureau of Mines, and other federal agencies has provided a wealth of information on how better to recover, recycle, and reuse materials and energy from our solid waste. Other studies in the public and private sector have added to this knowledge. The National Commission on Materials Policy has made recommendations on how to incorporate this knowledge into national policy and programs. The gist of these efforts is clear: So long as economic pressures tilt the balance toward cheap but environmentally undesirable disposal, and so long as no consistent and uniform rules exist for private and public operations, the necessary transition from poor solid waste management to optimum management will not take place as quickly as it should.

Thus, the stage is set for federal action. Now it is up to the Administration and the Congress to adopt a national policy and establish substantial programs to put our knowledge to work. It is up to us as citizens to see that this is done, because we are the ones who will have to bear the brunt of the inevitable garbage/trash crisis if nationwide action is not taken soon.

The Committee feels that a national solid waste policy should include at least the following major elements:

1. **Interstate transportation rates should be revised to promote the movement of recyclable materials.** At present, freight rates approved by the Interstate Commerce Commission (ICC) make it more economical for producers to use virgin materials than those recovered for recycling. In the case of ferrous scrap, for instance, the Institute of Scrap Iron and Steel indicates that on the average it costs at least twice as much to ship ferrous scrap as newly mined ore. By also considering the cost of shipping the coal and the other reducing elements necessary to process the two sources, iron ore gets a freight rate advantage of at least $1.49 per ton less than for scrap iron. Similar discrepancies exist with regard to other secondary materials such as glass and rubber.

2. **Federal agencies should be required to carry out programs of resource recovery, recycling, and reuse.** For example, these agencies should be required to manage their own wastes in a way that maximizes materials and energy recovery. To close the circuit, federal purchasing practices should give priority consideration to competitive products with the highest percentage of reclaimed or recycled content. The General Services Administration has taken initial steps by modifying paper specifications in this regard. But more can be done. Until the federal government leads the way, it is going to be difficult to get others to follow suit.

3. **Consideration should be given to federal tax measures that will provide economic incentives for private industry to reduce the depletion of critical natural resources and to maximize resource recovery, recycling, and reuse.** There are several things that can be done in this area, but the issues are complex and need careful deliberation.

> a. **Tax incentives to encourage increased production and use of recycled materials.** The current tax system encourages the use of virgin materials through the capital gains treatment of timber and the depletion allowance on virgin minerals. To offset these incentives, it would be appropriate to provide equivalent incentives to the reuse of scarce materials and to encourage energy savings through the recycling of such materials as steel instead of producing them from raw ore.
>
> A principal argument against tax incentives for recycling of selected products is that, to the extent virgin materials are scarce, their prices will rise and encourage use of recycled materials even without tax incentives. In addition, since a substantial amount of recycling already is taking place, tax incentives would produce a substantial "windfall" element. Even if this element were reduced by focusing on "additional" recycling investment, it would be diffi-

cult to segregate the new activity in many cases, and claims will be made that those who were initiators in the recycling would be discriminated against.

b. **Rapid amortization for recycling facilities.** This would encourage private firms to enter the industry, whereas now there is little resource recovery from municipal solid wastes other than various EPA-supported projects. Although municipal governments theoretically could undertake this activity and sell the usable wastes, they are operating under tight budgets which do not provide the flexibility they need to undertake these investments. The arguments against rapid amortization claim that it would be difficult to restrict the provision only to disposal of municipal, consumer, and commercial solid wastes. Broader coverage would provide a tax windfall for a well-developed industrial solid waste disposal industry. Also, new plants enjoying rapid amortization benefits would be given unfair competitive advantage over firms with plants built before availability of this provision.

4. **The question of providing federal grant assistance or loan guarantees for the construction and/or operation of resource recovery facilities needs very careful deliberation.** Currently, the initial capital investment to replicate the present demonstration projects varies, depending upon the type and size of process, from $7.5 million (fuel recovery) to $12.3 million (pyrolysis) for handling 1000 tons per day. Many communities, because of institutional or fiscal limitations, feel unable to launch such programs without financial assistance; and proposals to solve this problem cover a wide range. On one hand there are proposals to launch a massive federal grant and/or loan guarantee program for facility development and operation. On the other hand, there are claims that it is now economically feasible for private industry to build and operate municipal solid waste disposal systems without federal assistance. By presenting here at least some of the pertinent aspects of the alternatives, we hope to provide a basis for citizen selection and support of the best course of action to pursue.

a. **Federal grant and/or loan program** — During the past decade, many federal grant/loan programs have been initiated to assist state and local governments in meeting the social or environmental needs of their constituents. Such assistance has been justified where the impact of the problems has national implications, where the state or local resources are insufficient to cope with the situation, or where there are insufficient economic incentives to solve the problems by other means. Such were the situations that justified federal assistance to meet health, education, welfare, outdoor recreation, and open space needs and to solve air and water pollution problems. Although some financial assistance of this nature is still dispersed on a categorical basis, much has recently been encompassed into federal revenue-sharing programs.

Many feel that the solid waste situation is comparable to these other social and environmental issues, and that in spite of the expense and the probable three- to five-year lead time needed to

institute a federal grant or loan program, such action is justified. Arguments for such action are based on the belief that in several respects federal anti-pollution policies have compounded local solid waste collection and disposal problems, that state and local budgets are already too strained to support substantial new capital investment, and that revenue sharing has not produced significant developmental work in solid waste management. Concerning claims that private industry can do the job without financial assistance, federal aid proponents skeptically point out the lack of any widespread initiation of such action.

Based on these premises and on cost estimates developed in conjunction with state and local governments, proposals before the Congress in mid-1974 include a three-year program encompassing up to $825 million in low-interest loan guarantees for facility construction, $190 million in grants for facility construction if loans are not available, and $200 million in grants for operation and maintenance of disposal facilities if such operations cannot be accomplished as effectively by other means without federal assistance.

b. **Alternatives**—Those who feel there is no need for federal financial assistance present equally persuasive arguments for alternative approaches to the problem. The states of Connecticut and New York, for instance, have initiated statewide programs without federal grants and/or loans. Connecticut established a Resource Recovery Authority with $250 million bonding authority for the construction of 10 separate regional facilities to process 84 percent of the state's waste. The first plant is to be operational by 1976. In New York State, grants totaling $175 million out of a 1.1 billion environmental bond issue passed in 1972 will be made to local communities for construction of facilities, some of which will be operational by late 1975 or early 1976.

At the local level, New Orleans has reached an agreement with the National Center for Resource Recovery (a corporation representing a number of major U.S. industries and labor organizations) to assist in the construction and operation of facilities to recover and market much of the city's solid waste. The city of Chicago and the Commonwealth Edison Company have made a joint commitment on a project to use shredded solid waste as fuel, and similar projects are under way in New York City; Boston, Brockton, and Saugus, Massachusetts; and Nashville, Tennessee. At least 10 other cities are planning to proceed on their own initiative.

Several industrial companies have developed systems to process and dispose of municipal wastes at a profit. Already, they are presenting bids to various cities, claiming they can institute these new systems faster than cah be accomplished through normal local government procedures and that they can dispose of municipal waste as or more cheaply than the present or projected methods in these communities. This competitive situation results largely from at least two factors that have developed rapidly during the past

year: (1) the rising prices for the fuel and the materials recovered (coal and oil prices have doubled; those of recycled newsprint and some grades of scrap steel have tripled); and (2) the scarcity and rising costs of municipal disposal sites and the increasing costs of disposal methods that satisfactorily meet health and environmental standards. An answer to the criticism that so few privately financed processes have actually materialized is the reluctance of many communities to change from established disposal practices. Another key factor is the current shortage of construction capital.

5. **Federal legislation requiring a refundable deposit on all beverage containers is needed to promote the use and reuse of refillable instead of throwaway beverage containers.** As discussed earlier, such action would reduce litter, household rubbish, and consumer expenditures. Moreover, and most importantly, such action would reduce the waste of critically short supplies of energy and nonrenewable resources. On the other hand, enactment of such a measure probably would have adverse impacts on the industries that manufacture and market the "no-deposit, no-return" cans and bottles which are now so prevalent in the marketplace.

With more than 30 states and 25 communities considering different forms of beverage container regulation, why do we need federal legislation that focuses only on beverage containers?

The first and foremost reason is that the energy shortage is a critical national problem, and refillable beverage containers provide an inexpensive, expeditious, and energy-saving alternative to the continued proliferation of energy-wasting disposable beer and soft drink containers. On a nationwide basis, resumption of an all-returnable beverage container system could almost immediately save an energy equivalent of nearly 5 million gallons of gasoline per day. This is equal to the estimated energy yield by 1978 from a crash program to produce oil from shale rock—a project which will involve the expenditure of billions of dollars in capital investment, unprecedented environmental disturbance, and the daily creation of a pile of waste rock six times larger than the Lincoln Memorial.

The second major reason for federal beverage container regulation is that deposit legislation is more feasible and less disruptive when implemented nationally instead of on a state-by-state basis. Federal legislation will solve the problems of interstate bootlegging and littering as well as provide uniform requirements for containers and thus make for less economic disruption in the long run. Checkerboard state-by-state action drawn out over years of legislative debate will result in the unresolved problems becoming regionalized in the areas most reluctant to deal with them, thereby prolonging their final resolution.

The third important reason for federal legislation of this type is timing. Whereas new technologies for solid waste resource recovery will take years to implement on a national basis, required deposits on beverage containers will produce more immediate results. In Oregon, for instance, a year after its bottle bill went into effect, officials were reporting 75 to 85 percent fewer beverage containers in roadside litter, 385 million fewer containers produced, and considerable energy savings. On a nationwide basis, the results would, of course, be far more substantial.

Another important reason for a federal bottle bill is the very real need for federal leadership in establishing a new national conservation ethic that emphasizes prudent consumption of energy and materials resources. Enactment of federal beverage container legislation could be highly significant as a first substantial, nationwide, "waste not, want not" step toward this national conservation ethic. In terms of energy conservation alone, Congress and the Administration could take a giant step forward toward solving the energy problem.

Several beverage container bills have been introduced in the Congress, and the Administration has endorsed the concept of requiring a refundable deposit on all beer and soft drink containers if it is phased in over time. This call for a phased approach is caused by concern about ways and means to reduce the adverse economic impacts resulting from a switch from the manufacture and distribution of disposable bottles and cans to returnable, refillable containers. This is a valid concern, and any federal enactment should include provisions for relieving and/or reducing the adverse effects of job relocation and production changeovers to refillable bottles.

With regard to economic impact, it is important to remember that the suggested legislation would not *ban* throwaway containers; it simply mandates a *refundable deposit* on each container sold. Thus, instead of affecting only container manufacturers, the refund creates economic incentives to influence the consumer as well as the beverage industry to decrease waste. The mandatory deposit, moreover, would make Americans aware of the cost of waste—an extravagance of energy and resources that our society can no longer afford.

Time Is Important

Obviously, the sooner federal programs to foster the recovery, recycling, and reuse of the resources in our solid waste are put into effect, the sooner we can realize the benefits on a nationwide basis. Nationwide, energy of *any* kind is needed *right now.* Furthermore, municipal solid waste disposal problems are fast approaching crisis proportions. Various bills to strengthen the federal role along the lines suggested herein have been introduced in both Houses of Congress. These and other measures are being deliberated in various subcommittees, where citizen concerns for early passage could appropriately be focused. On the Senate side, measures to (1) change interstate transportation rates, (2) require intensification of federal agencies' recycling efforts, (3) provide grant and/or loan assistance, and (4) regulate beverage containers are being ccnsidered both in the Commerce Subcommittee on Environment and also in the Senate Public Works Subcommittee on Air and Water Pollution. In the House of Representatives, these measures are being handled by the Interstate and Foreign Commerce Subcommittee on Public Health and Environment. The Joint Committee on Internal Revenue and Taxation is studying various tax incentive proposals which must first be passed by the House Ways and Means Committee.

CHAPTER IV: CITIZENS CAN MAKE THE DIFFERENCE

The Committee believes that the nation is coming closer to establishing a national policy of resource recovery, recycling, and reuse, largely because of the growing interest and concern expressed by numerous citizens' groups across the country in recent years. They surely have been a major factor in causing governments and industries to move faster in devising successful recycling programs. Anti-litter campaigns and the establishment of local recycling centers have focused public attention on the potential of recycling. When properly organized, these efforts can and do serve as a valuable educational tool for improving local communities.

Despite these efforts, the Environmental Protection Agency reported in early 1974 that the percentage of recycled resources now being used is lower than ever before in history. Too often, citizen groups have rushed into setting up local recycling centers, for example, only to find that poor planning, lack of existing markets, and a tapering-off of volunteer participation forced them to close down. Having started with high expectations, many people are thus discouraged about the potential of recycling as a result of this experience.

The Citizens' Advisory Committee, though, is still convinced that citizen groups have and will continue to have an extremely significant role to play in furthering a recycling policy. The very existence of these citizen groups and their obvious commitment to resource conservation is a clear sign of public interest and willingness to move in this area. While the total volume of bottles, cans, and paper collected or separated at home may be only a small percentage of the total produced, this at the very least is a beginning solution to a very large problem. These are the actions that can hold the line until government and industry are able to build a significant number of total waste recovery plants around the country. On a continuing basis, the citizen actions suggested in this booklet make good sense in modifying a nationwide life-style that has been unnecessarily and foolishly wasteful.

At this point, no one is sure how willing the majority of American consumers are to abandon the pervasive "convenience psychology" that now exists. By and large the average citizen has not been making a connection between his increased consumption of packaging materials, for instance, and the increasing costs of local refuse collection which are paid out of his taxes. Even more critical is the amount of energy and other valuable resources now being wasted under existing practices.

It is on this latter point that this booklet has focused, with the hope that the facts presented herein will help overcome the major impediments to large-scale recycling for the recovery of resources and energy.

Individual Citizen Action Check List for the Home and Community *

Think About the Disposal Problem and Energy Factor of Every Purchase.

—— You'll conserve energy, reduce waste, and save money by buying beer, soft drinks, milk, and water in returnable bottles — and returning them. If returnables are not available or if they cost more, complain to the store manager.

—— Look for long-life products, and avoid plates, cups, and eating utensils that are designed for one-time use.

—— Consider using cloth instead of paper for towels, napkins, handkerchiefs, diapers. If paper serves a better purpose, insist on those products made from recycled paper.

—— Cut down on items that are overpackaged by buying in bulk whenever possible, and then transfer them to smaller containers at home. This reduces the number of containers discarded and saves considerable money. Avoid individually wrapped slices of cheese and prepackaged fruits and vegetables. Complain to the manager if you are given no alternative.

—— Avoid prepackaged and precooked foods. Cooking from scratch not only wastes less packaging but may cost you less as well.

—— Avoid products packaged in plastics made from petroleum derivatives. Ask your butcher for paper meat trays and your grocer for paper bags in which to put your fruits and vegetables.

—— Avoid products packaged in polyvinyl chloride containers (clear, semi-rigid, glass-like containers which frequently hold shampoo, hand lotion, mouthwash, and cooking oil). These petroleum derivatives give off poisonous fumes when incinerated.

—— When environmentally good products come on the market, buy them, and urge others to do so too.

Think About Reusing Items Around the Home.

—— Scarce paper can be saved by shopping with your own canvas or other reusable shopping bags.

—— Use old newspapers to polish windows and tiles, to clean ovens, and to wrap gifts.

—— Reuse old envelopes and both sides of stationery.

—— Reuse gift wrapping paper and ribbons. Don't wrap presents that come in a box and don't use plastic tape which spoils wrapping paper for reuse.

—— Share magazines with friends, or give to libraries or other institutions.

—— Return metal coat hangers to your cleaner.

—— Don't throw products into the trash heap when they still have a useful life. Take old furniture and clothing, as well as appliances and toys, to the Salvation Army, Goodwill Industries, or a secondhand shop.

—— If you have a garden or backyard, keep your vegetables and fruit scraps, coffee grounds, and tea leaves, as well as your yard wastes, to make a compost pile.

Think About Assisting the Recycle Process.

—— Collect newspapers, cardboard, and clean paper for separate collection or personal delivery to recycle center.

—— Use different colored containers to collect bottles, aluminum, and tin cans after removing tops and paper labels. Deliver to recycle center when convenient.

—— Flatten cans and boxes, and crush other containers before discarding or holding for recycling collection. Ordinarily, ninety-eight percent of the space in a full trash can is air.

—— If there is no nearby recycling center, consider starting one. Write to Concern, Inc. (2233 Wisconsin Avenue, N.W., Washington, D.C. 20007) for its Recycling Center Plan.

Reduce Litter at Its Sources.

—— As a pedestrian, place candy, gum wrappers, empty cigarette packages, cigarette butts, and other disposable items in sidewalk trash receptacles. If local government doesn't furnish and maintain these, insist that it be done.

—— In automobiles, carry a trash collection container, and use it and the ash tray.

—— In the home, securely enclose garbage and trash put out for collection.

—— Offices and commercial establishments also should use enclosed collection containers.

—— Loading and unloading platforms should be well policed each day to eliminate litter.

—— Trash collection organizations and companies that use open trucks to carry loose materials should keep such trucks covered.

—— Contractors at construction sites should provide and regularly service appropriate on-site receptacles for light construction refuse and for employees' lunchtime and coffee-break discards.

Encourage Others to Think About Waste and Energy Conservation.

—— In the marketplace, ask stores to carry returnable and reusable products and to foster the reduction of superfluous packaging.

—— In the office, start a reuse, recycling program: use of both sides of stationery, separate collection of newspapers, scrap paper, boxes, and other paper products that can be delivered to a recycle center.

—— In your community, encourage energy conservation through the reduction of solid waste and litter. Foster recycling centers. Encourage better community waste collection systems that are more efficient, save money, and that facilitate recycling and energy conservation.

—— In your community, find out what stores, hospitals and other institutions are doing to encourage the recycling of their solid waste. Urge them to set an example for industry and citizens in the community. Reward them by telling the community what good things they are doing.

—— Check on your local community disposal sites. Demand the closure of any open dumps.

—— Investigate the solid waste practices of local industries. Urge improvement of measures that do not foster or facilitate recovery and recycling.

—— Industrial executives and company owners, as responsible community citizens, can instill good solid waste management practices into the work patterns of their employees.

*This check list was compiled from similar lists previously published by Concern, Inc., the League of Women Voters, and other sources. The U. S. Environmental Protection Agency is preparing other information materials along these lines. They will provide suggestions on ways and means to help neighborhood and civic groups stimulate and support better solid waste management at both the consumer and community level. For information on the availability of these materials, we suggest writing to the Office of Solid Waste Management Programs, U. S. Environmental Protection Agency, 1835 K Street, N. W., Washington, D. C. 20460.

GLOSSARY OF SOLID WASTE TERMS

The following are brief definitions of key words or phrases used in this publication. They are prepared for lay readers and should not be considered technically complete. Some are excerpts from the National Center for Resource Recovery (NCRR) publication GLOSSARY OF SOLID WASTE MANAGEMENT, which encompasses many more terms and is available from NCRR for 40 cents (Order No. NCG-03-02). Address: 1211 Connecticut Avenue, N.W., Washington, D.C. 20036.

Bottle Bill

The vernacular term applied to various federal, state, or local legislative proposals to encourage the refilling and reuse of glass bottles, instead of nonreturnable beverage containers.

British Thermal Unit (Btu)

The unit of heat required to raise the temperature of one pound of water one degree Fahrenheit at or near 39.2 degrees Fahrenheit. In resource recovery systems, Btu's indicate the amount of heat energy available if a given amount of waste is burned.

CONVERSION TABLE

To Convert From	To	Divide By
Btu's	Barrels of Crude Oil	5,600,000
Btu's	Gallons of Gasoline	125,000
Btu's	Kilowatt-hours	3,412.8

Disposal Capacity

The amount of land now being used or designated for deposition of municipal solid waste refuse or the residue from the processing of such by incinerator or other methods.

Ferrous

Metals predominantly composed of iron. In municipal waste, these usually include steel or "tin" cans which can be separated out by use of electromagnets.

In-Plant Waste

Waste generated in the manufacturing process, such as the trimmings from the shaping of sheet metal products. It may be recovered through internal recycling or through a salvage dealer.

Litter

That highly visible portion of solid waste generated by the consumer and carelessly discarded outside of the regular disposal system.

Nonferrous

Metals which contain no iron. In waste materials these are usually aluminum,

copper wire, brass, bronze, etc., which cannot be separated out by magnetic means.

Pilot Plant

Any small-scale experimental facility constructed for the purpose of investigating or testing the technological feasibility of a new energy recovery or resource recovery technology.

Plastics

Man-made materials containing primarily carbon and hydrogen, with lesser amounts of oxygen, nitrogen, and various organic and inorganic compounds. Plastics, technically referred to as "polymers," are normally solid in their finished state, but at some stage in their manufacture, under sufficient heat and pressure, they will flow sufficiently to be molded into desired shape. Thermoplastics, such as polyethylene, polyvinyl chloride (PVC), polystyrene, and polypropylene, become soft when exposed to heat and pressure, and harden when cooled. Thermosetting plastics, such as phenolic and polyester, are set to permanent shapes when heat and pressure are applied to them during forming, and reheating will not soften these materials.

Pyrolysis

The process of chemically decomposing an organic substance by heating it in an oxygen-deficient atmosphere. High heat is usually applied to the material in a closed chamber evaporating all moisture and breaking down materials into various hydrocarbon gases and carbon-like residue. The gases may be collected with suitable equipment, and used or sold. The residue may be further processed into useful materials, such as carbon, sand, and grit, or can be landfilled.

Recycling

A resource recovery method involving the collection and treatment of a waste product for use as raw material in the manufacture of the same or a similar product—e.g., ground glass used in manufacture of new glass.

Residential Waste

Waste materials generated in houses and apartments. The materials include paper, cardboard, beverage and food cans, plastics, food wastes, glass containers, old clothes, garden wastes, etc.

Resource Recovery

A term to describe the extraction and utilization of materials and values from the waste stream. Materials recovered, for example, would include metals and minerals which are used as "raw materials" in the manufacture of new products. Recovery of values would include energy recovery by utilizing components of waste as a fuel, production of compost using solid waste as a medium, and reclamation of land through sanitary landfills.

Reuse

The use of a waste material or product more than once. For example, containers are reused when they are returned and refilled.

Sanitary Landfill

A method of disposing of refuse on land without creating nuisances or hazards to public health or safety. Careful preparation of the fill area and control of water drainage are required to assure proper landfilling. To confine the refuse to the smallest practical area and reduce it to the smallest practical volume, heavy tractor-like equipment is used to spread, compact, and usually cover the waste daily with at least six inches of compacted dirt. After the area has been completely filled and covered with a final 2- to 3-foot layer of dirt and has been allowed to settle an appropriate time, the reclaimed land may be turned into a recreational area such as a park or golf course. Also, under certain highly controlled conditions, the land may be used as a plot on which some types of buildings can be constructed.

Separation

To divide waste into groups of similar materials, such as paper products, glass, food wastes and metals. Also, the further sorting of materials into more specific categories, such as clear glass and dark glass. Separation may be done manually or with specialized equipment.

Solid Waste

In broad terms, solid waste includes the unused, unwanted solid materials discarded in the process of production and consumption of commodities used by our society. As such, it includes the 4.5 billion tons of animal, mineral, crop, industrial, and municipal waste materials generated in the United States in 1971. As used in this publication, it refers to the garbage, rubbish, and trash discarded from our homes and places of business and the litter scattered across our landscape. It does not include the human and other wastes that enter the sewerage stream.

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targets, means and impacts of source reduction

REDUCE

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foreword

Two possible methods have emerged to alleviate the serious depletion of materials and energy caused by the amount of waste we generate. One, recycling, has been discussed in full in the companion volume to this publication, *Recycle? In Search of New Policies for Resource Recovery* (#132). The second is waste reduction or cutting down on the amount of waste created in the first place. Recycling and waste reduction are not mutually exclusive but are complementary goals for solid waste policy.

The controversy surrounding attempts to reduce the solid waste stream—those materials and goods we use and then discard—is well illustrated by two architectural axioms. The late Mies van der Rohe, in describing the spare, clean lines of the International Style he made famous, said that "Less is more." In contradiction to Mies, Robert Venturi, a Philadelphia architect, said, "Less is a bore."

The disparity between two extremes is apparent in the way we view our consumption habits, particularly for disposable goods and packages. Either those items symbolize American affluence and one of the highest standards of living in the world, or else they are a serious symptom of our excessive and to some, indefensible use of scarce resources and energy.

No matter what view one takes, any discussion of reducing wastes and determining the impacts of waste reduction is bound to lean heavily on data collected by researchers in the public and private sectors. The U.S. Environmental Protection Agency has collected much of that data—a great deal of it from other government agencies and from industry. Its data has been attacked as biased or incomplete; but in the almost total absence of data from other and more varied sources this pamphlet relies heavily on EPA's work. The League of Women Voters Education Fund welcomes additional reliable data readers may wish to submit. Until everyone has more information, pro or con, there can be no definitive work on waste reduction—and no satisfactory resolution to the problem.

1. introduction

In 1973, Americans threw onto the discard pile over 2 million tons of major appliances. We scraped over 22 million tons of food into our garbage cans. We used once, then tossed out, nearly 10 million tons of newspaper and almost 3 million tons of paper plates, paper towels and paper napkins. We discarded over 52 million tons of bottles, cans, plastics, paper, and other containers that had no primary use at all: they were packaging for the products we *did* use. All told, almost 95 million of the 144 million tons of municipal wastes discarded that year fell into these categories—packaging, single-use convenience items, or major consumer items designed for quick obsolescence. *(1)*

That's a lot of waste, but the costs of our indulgence in a throw-away society are not confined to the price tags of the products themselves. Collecting and disposing of solid waste will cost the nation almost $45 billion between 1973 and 1982. *(2)* In order to produce the accoutrements of our "disposable" culture, we constantly extract natural resources and then process them with profligate use of energy. Nor does the sum of these outlays reveal the bottom line in our "cost accounting." The damages we wreak on the environment, at every step in this wasteful lifestyle, must also be added in—landscapes scarred, water resources abused, the air we breathe and the water we drink defiled by pollutants. All these mean losses in money and quality of life and in turn require further outlays of money and human energy to restore what we can, where we can.

The proliferation of wastes has other impacts as well: the mayors of the nation's cities report that over half of all cities will run out of disposal sites within the next five years. *(3)* The U.S. Environmental Protection Agency (EPA) reports that potential hazards associated with land disposal of solid waste, including leachate from landfills, may require us to look elsewhere for places to dump our trash. Federal and state air pollution laws mean that many municipal incinerators will have to be upgraded to meet air quality standards; that simply burning wastes can no longer be permitted. And federal laws limiting or prohibiting ocean disposal of wastes will force several

coastal cities to stop using the sea as a dump.

We have come to the point of having so much waste and so few places left to put it that government, citizens, and industry are being forced to reexamine traditional ways of using and wasting materials and energy. One possible solution is well known to most people—**recycling** (see the LWVEF's companion publication, *Recycle?*). But another answer, one fundamentally more conservative because more earth-saving, is to reduce the amount of wastes generated and materials consumed—**source reduction.**

The rationale for reducing waste at its source is that

- we will reduce the solid waste stream;
- we will reduce raw materials consumption;
- we will reduce energy consumption;
- we will reduce environmentally damaging resource extraction;
- we will use less land for waste disposal and will begin to eliminate waste disposal methods that damage the air, land and water.

In the eyes of some, benefits such as these make source reduction the *sine qua non* of waste management. Other ramifications of waste reduction, however, are far less objective, far less certain. Opponents—primarily, though not exclusively, from industry and organized labor—cite the economic, employment and consumer impacts of any source reducing measures and warn that the nation's already weakened economy cannot sustain further jolts.

The argument has become increasingly polarized as government activities, particularly those of the Office of Solid Waste Management Programs (OSWMP), begin to support some institutionalized source reduction programs. Controversy mounts over the consequences of implementing source reduction measures and the alternative consequences of not implementing them. Its range and rising intensity make it evident that we must hammer out—through public dialogue, careful research, well-mounted experimentation, responsible leadership from all sectors, and sophisticated controls—a variety of policies by which we can simultaneously conserve resources and energy, protect the environment, *and* maintain a healthy and productive economy.

2. the solid waste program to the present

A child was killed and her parents suffered severe brain damage when carbon monoxide from a nearby smouldering dump migrated into the crawl space of the family's home.

THE PHILADELPHIA ENQUIRER
January 9, 1973

Ten years ago, motivated by increasing knowledge about environmental damage, government policies for solid waste management focused on the need to close open dumps: upgrading open or burning dumps to sanitary landfills would minimize air pollution and aesthetic blight. Landfilling was touted as the solution to waste disposal. Landfill advocates took pictures of houses built on completed landfills, of children and golfers playing on finished sites. Despite the apparent amenity of a landfill, however, local officials faced with the task of locating a disposal site got constant and intensive opposition from area residents. As they met with a defensive turf attitude—"not in my back yard"—solid waste managers had to start looking afresh at the question of how to get rid of solid waste.

This stimulus was augmented by a growing awareness about raw materials shortages, real and potential. The depletion of domestic supplies of many nonrenewable resources, our dependence on foreign sources for those materials, and the need to protect the environment from many damaging mineral extraction processes pointed to the need for resource conservation.

The National Commission on Materials Policy, created by the 1970 Resource Recovery Act, prepared in 1973 a lengthy study of the materials use cycle and gloomily concluded that the nation faces potential shortages of 6 of the 13 basic raw materials upon which it depends for industrial production; by 1985, said the report, we can expect our reliance on imports to spread to 9 of those 13 *(1)*

resource recovery—good but not enough

These data led the commission to recommend that the nation step up activity in recycling—the recovery of waste materials from the post-consumer and industrial waste streams.

Though the secondary materials industry has for many years been recycling wastes for resale to industrial processors, the total recovery is small—only 9.5 million tons (7 percent) of post-consumer wastes and about 35 million tons (18 percent) of industrial scrap. *(2)* The secondary materials industry struggles with chronic problems, from the boom-or-bust nature of the market to the anti-scrap bias that seems to be built into many government policies, especially freight rates. *(3)*

Seeking ways to whittle the mounting waste heaps, EPA has awarded demonstration grants to six local governments for pilot projects, in cooperation with industry, to try out some new ideas about recovering materials and energy from the solid waste stream. Two projects are now in operation, a power plant in St. Louis that uses shredded waste as a supplemental fuel and a materials recovery facility in Franklin, Ohio. An energy recovery plant located in Baltimore is now in the testing stage. Other EPA-funded projects are under construction or are planned in San Diego (energy recovery), Wilmington, Delaware (energy recovery or compost), and Lowell, Massachusetts (incinerator residue recovery). Industries, too, have continued to develop energy and materials recovery systems.

The EPA pilot projects rated very few headlines until the Arab oil embargo in the winter of 1973-74 drove home to most Americans the lessons of resource and energy wastefulness. Interest in new energy sources, among them, solid waste, skyrocketed. A number of cities planned to have energy recovery systems installed. Several states passed laws authorizing the creation of recovery authorities to develop state waste management and resource recovery systems.

The more closely people looked at potential energy savings from various solid waste management programs, the more evident it became that there was yet another way to conserve materials and energy, a way that could be more effective than recycling. If we reduced the amount of products we make and discard, if we used fewer materials and less energy to manufacture the products we do make, if we redesigned products to ensure their longer life, we would conserve tremendous amounts of energy.

The interest shown in solid waste reduction programs by government, citizens, environmentalists and industry is a reflection of changing national priorities and needs. **It is increasingly apparent that the partner goals of environmental protection and resource conservation can be achieved only through policies that reduce that portion of the waste stream that can be reduced, recover its nonreducible portion, then ensure safe disposal of the rest.**

what's involved?

Because of its far-reaching impacts, waste reduction at source has caught the attention of all people involved in solid waste and materials policy. Congress and state legislatures around the country are considering source reduction measures. Several states and a few cities have passed laws attacking specific problems—promoting use of refillable beverage containers, for example. Industry is developing product manufacturing processes that reduce materials and energy use. Consumers are buying products with an eye to their reusability and durability. But the issue of whether source reduction will go beyond preliminary study and moderate public interest will depend in large part on the actions that all of us take. It is clear that there are important choices to be made—about the types of things we consume, the ways we consume, and the way in which we view materials and energy availability.

Do we believe, Malthusian fashion, that we will run out of resources if we continue to consume the way we now do? Do we believe that there will always be a technological "fix" available, so that if we run out of one resource we will be able to find a new material to substitute for it? (4) Or are we at the end of our "resource frontier"? If so, does this mean that we can no longer expand and develop but must conserve and make do with that we have? Are we prepared to alter established industrial processes... economic structure . . . lifestyles? If we opt to limit growth, who will do it, and how?

3. targets for waste reduction

Somewhere along the line, too many Americans lost the pioneer ethic of 'waste not, want not.' Today, largely because we have forsaken frugality for a carefree abandon born of affluence, the abundance of materials—and of their packaging—is taken for granted, discarded casually, and forgotten as soon as the garbage and trash are removed from the doorstep.

ENERGY IN SOLID WASTE: A CITIZEN GUIDE TO SAVING
Citizens Advisory Committee on Environmental Quality

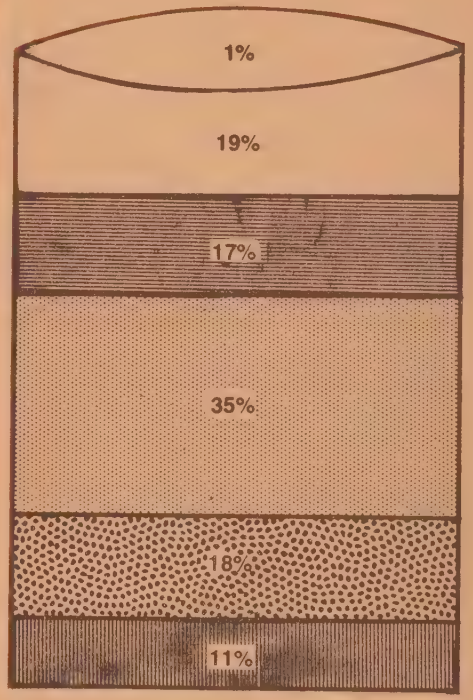
In 1973, the people of the United States *generated* 144.2 million tons of municipal waste. (Translation: commercial and residential waste—not waste from industry, mining or agriculture.) Of that staggering total, only 9.5 million tons were *recycled. (1)* That means almost 134 million tons were lost to reuse in any form. Table 1 shows categories of municipal wastes, with the amount generated, the amount recycled and the volumes ultimately discarded in each category. Figure 1 sums up the evidence:

- **Durable goods,** including major appliances and tires, account for over 1 of every 10 tons (almost 14.5 million tons).
- **Nondurable goods**—chiefly paper items such as discarded newspapers, office papers, paper plates, paper towels, etc.—make up the next largest segment, almost 2 of every 10 tons.
- **Containers and packaging**—make up 3½ of every 10 tons in the solid waste stream. (47 million tons).

Since over 60 percent of all wastes are discarded consumer products, (the three categories above) it is these wastes that are the most inviting targets for source reduction measures.

durable goods

Durable goods consist primarily of large items that have outlived their usefulness, at least to their original owner. Large appliances



Source: F. A. Smith, Resource Recovery Division, OSWMP,1974.

Figure 1: The Makeup of the Solid Waste Stream

(such as furniture, washing machines and television sets) that are damaged, or are too expensive to repair, or have been replaced by newer models end up in the municipal waste stream, even though many could be repaired or contain valuable scrap materials. Only a small percentage of such discards go to second-hand stores for resale.

While the aggregate weight of durables is far lower than that of other categories the bulk of individual items within this product class makes them especially hard to dispose of properly.

Tires are also included in the durables category. EPA estimates that 266 million tires were shipped within the United States in 1971. During that same year, 250 million tires were taken out of use. *(2)* Of these, only about 46 million were retreaded, 7 million recycled by the rubber reclaiming industry, and 2 million used by tire splitters (that is, split and die-cut into products such as gaskets, tail pipe insulators and door mats). The remaining 195 million tires were thrown out or left on abandoned vehicles. *(3)*

Because tires are virtually indestructible, they are especially hard to dispose of properly. If landfilled intact, they use up large amounts of landfill space, and they tend to resurface, to boot. Tire shredding before landfilling alleviates these problems, but because it is costly it is not widely practiced. Nor is incineration the answer; if tires are present in large proportion, they can damage furnace walls and require flue gas controls. *(4)*

Industry and government (particularly the U.S. Bureau of Mines) are working on recovery of materials and energy from discarded tires, but the systems under study (which include energy recovery; road building; reef building; and recovery of carbon black, used in tire manufacturing) appear to be too costly or too limited in their impact.

One possible solution, tire retreading, has been ignored in recent years, largely because of poor retread tire performance and negative consumer attitudes. Many tires are so worn and the tire carcass so weakened by the time they are discarded that retreading has been difficult and dangerous. Another solution, steel-belted radial tires, is discussed on page 18.

nondurable goods

The second major category of post-consumer waste consists of products, many of them paper-based, designed for short-term or single use—newspapers, books, magazines, paper tissues and towels, paper plates and cups. Nondurables constitute a large portion of the waste stream, and they present less complex disposal problems for solid waste managers. Papers can be shredded for landfilling; they can be incinerated. Much of this fraction of the waste stream is organic and can therefore be used as fuel in energy recovery facilities. Most paper goods are recyclable, and high-grade office papers and computer cards bring the highest prices of all paper products in the scrap market.

Nondurables are excellent candidates for source reduction programs because in many instances they have replaced items that were reusable and these reusable substitutes are still available. Disposable paper diapers have replaced cloth diapers; paper cups have replaced more permanent containers.

packaging and containers

The bottles, boxes, cans, cartons, wrappings, and the like—packages and containers in which we transport and sell food and other goods—are, by weight, the largest portion of the waste stream. *(5)* A look at some figures detailing the growth of packaging will explain why.

Table 2 shows that total consumption of materials used in packaging increased by nearly 71 percent between 1958 and 1971, with the highest growth coming from aluminum and plastics, the lightest of the materials. When we look at per capita consumption (which allows us to correct for population growth) the increase is still enormous, almost 44 percent in thirteen years. This prodigious growth rate makes materials for packaging constitute a significant percentage of materials use (see Table 3).

As Table 3 indicates, almost half of all paper production, three-fourths of all glass produced, more than 8 percent of all steel, 14

Product-Source Categories	Gross Discards	Material Recycled Quantity	Material Recycled Percent	Net Waste Disposal Quantity	Net Waste Disposal % Total Waste	Net Waste Disposal % Non-food Product
Durable Goods	14,700	300	2%	14,400	11%	17%
Major Appliances	2,200	100	4	2,100	2	2
Furniture & Furnishings	3,400	0	0	3,400	3	4
Rubber Tires	2,000	200	10	1,800	1	2
Miscellaneous Durables	7,100	0	0	7,100	5	8
Nondurable Goods, Exc. Food	27,930	3,770	13	24,160	18	28
Newspapers	10,400	2,450	24	7,950	6	9
Books and Magazines	3,720	330	9	3,390	3	4
Office Paper	6,390	990	15	5,400	4	6
Tissue Paper, incl. towels	2,320	0	0	2,320	2	3
Paper Plates and Cups	600	0	0	600	*	1
Other Non-packaging Paper	1,300	0	0	1,300	1	2
Clothing and Footwear	1,300	0	0	1,300	1	2
Other Misc. Nondurables	1,900	0	0	1,900	1	2
Containers and Packaging	52,270	5,330	10	46,940	35	55
Glass Containers	12,400	275	2	12,125	9	14
Beer & soft drink	6,100	190	3	5,910	4	7
Wine & liquor	1,970	25	1	1,945	1	2
Food & other	4,330	60	1	4,270	3	5
Steel Cans	5,650	60	1	5,590	4	7
Beer & soft drink	1,550	15	1	1,535	1	2
Food	3,140	35	1	3,105	2	4
Other non-food	960	10	1	950	1	1
Aluminum	820	35	4	785	1	1
Beer & soft drink	440	30	7	410	*	*
Other cans	50	5		45	*	*
Aluminum foils	330	0	0	330	*	*
Paper & Paperboard	28,230	4,960	18	23,270	17	27
Corrugated	15,100	3,290	22	11,810	9	14
Other paperboard	6,925	1,045	15	5,880	4	7
Paper packaging	6,205	625	10	5,580	4	7
Plastics	3,090	0	0	3,090	2	4
Plastic containers	510	0	0	510	*	1
Other plastics packaging	2,580	0	0	2,580	2	3
Wood Packaging	1,900	0	0	1,900	1	2
Other Misc. Packaging	180	0	0	180	*	*
Total non-food product waste	94,900	9,400	10%	85,500	63%	100%
Food Waste	22,400	0	0	22,400	17	26
Yard Waste	25,000	0	0	25,000	19	29
Misc. Inorganic Wastes	1,900	0	0	1,900	1	2
Grand Total	144,200	9,400	7%	134,800	100%	158%

*Less than 0.5%

Source: Frank A. Smith, Resource Recovery Division, Office of Solid Waste Management Programs, U.S. Environmental Protection Agency, November 1974.

Table 1: Post-consumer solid waste generation and recycling: Detailed product-source categories, 1973 (thousands of tons)

Packaging Material	Thousands of tons 1958	1971	Percent Change 1958-1971	Per Capita (in pounds) 1958	1971	Percent Change 1958-1971
Paper*	16,552	27,700	+ 67.3	193.0	271.3	+ 40.6
Glass	5,933	11,100	+ 87.1	69.2	108.7	+ 57.1
Steel	6,198	7,255	+ 17.1	72.3	71.1	− 1.7
Aluminum	97	757	+680.4	1.1	7.4	+572.7
Plastic	368	2,900	+688.0	4.3	28.4	+793.0
Wood and Miscellaneous	6,212	10,613	+ 84.2	72.4	103.9	+ 43.5
Total	35,360	60,325	+ 70.6	412.4	590.8	+ 43.3

Source: EPA. OSWMP. Second Report to Congress on Resource Recovery and Source Reduction. 1958 data from: Darnay, A., and W. E. Franklin, *The Role of Packaging in Solid Waste Management,* 1966 to 1976. Public Health Service Publication No. 1855, Washington, U.S. Government Printing Office, 1969. 1971 data from: Bureau of Domestic Commerce, U.S. Department of Commerce, 1971-1972, *Containers and Packaging.* American Paper Institute, *The Statistics of Paper,* Washington, 1972. The American Iron and Steel Institute, *Shipments of Steel Products,* Washington, D.C., 1972.

*Paper figures represent tonnage of paper packaging produced rather than tonnage of paper packaging consumed. Other material categories reflect consumption of packaging material.

Table 2: Consumption of packaging material, 1958-1971.

percent of all aluminum and 29 percent of all plastics were used for packaging and containerization.

These figures become even more revealing when we consider not just the raw resources chewed up and spit out but the energy required to transform these resources into packaging materials. In a study for EPA, Gordian Associates, a consulting firm, says that in 1971 5 percent (1,770 trillion BTUs) of all industrial energy consumed that year went to *produce* the materials that went into all forms of packaging (see Table 4). Still more energy was used to *fabricate* those materials into packages and containers. The impact of packaging both on resources and on the environment begins to strike home when we look at the ingredients of each of the basic packaging materials and the pollutants or residues resulting from production processes:

☐ To make 2,000 pounds of containerboard (18 million tons were produced in 1971) takes 3,688 pounds of wood, 261 pounds of lime, 360 pounds of saltcake, and 76 pounds of soda ash—and consumes 41 million BTUs.

☐ To make 2,000 pounds of glass takes 2,400 pounds of raw materials, including sand, soda ash and limestone. Manufacture takes 15.2 million BTUs, 14.5 million of which come from fossil fuel sources.

☐ To make 2,000 pounds of steel takes 1,970 pounds of iron ore, 791 pounds of coke and 454 pounds of lime, and over 29 million BTUs. And along with the 2,000 pounds of steel we get 780 pounds of problems: 538 pounds of solid wastes and 242 pounds of air pollutants.

Material	Packaging (10^3 tons)	Total Packaging and Nonpackaging (10^3 tons)	Packaging Percentage
Paper	27,700	58,652	47.2
Glass	11,100	14,900	74.5
Steel	7,255	87,038	8.3
Aluminum	757	5,074	14.1
Plastic	2,900	10,000	29.0

Source: EPA. OSWMP. Second Annual Report to Congress on Resource Recovery and Source Reduction. American Paper Institute, *The Statistics of Paper,* Washington, 1972; American Iron and Steel Institute, *Shipments of Steel Products,* Washington, D.C., 1972; Arthur D. Little, *Incentives for Plastic Recycling and Reuse,* Boston, 1972; U.S. Department of Interior, *Minerals Yearbook, Aluminum Chapter Reprint, 1971,* Washington, D.C., 1973; The Aluminum Association, *Aluminum Statistical Review—1971,* New York, 1972.

Table 3: Packaging material consumption in relation to total material consumption, 1971

☐ To make 2,000 pounds of aluminum takes 8,776 pounds of bauxite, 1,020 pounds of petroleum coke, 966 pounds of soda ash, 327 pounds of pitch, and 238 pounds of lime. Of the 197 million BTUs needed to make this ton, 169 million come from fossil fuels.

☐ And finally, to make 2,000 pounds of plastics requires 72 gallons of refined crude oil, 338 gallons of natural gas liquids and 37.1 million BTUs, almost all from fossil fuel sources. *(6)*

Not quantified, of course, in these data are the environmental impacts of discarding packaging, nor is there an accounting of the energy needed to dispose of those wastes in an acceptable manner. Conversely, none of the potential benefits of packaging have been quantified either.

Packaging seems to have a growth dynamic of its own, independent of the growth in consumption of the product that is packaged. Between 1958 and 1970, for example, per capita packaging consumption to deliver fresh produce increased by nearly 38 percent while per capita consumption of fresh produce declined by more than 11 percent. Table 5 details three instances in which packaging of a major food category grew while per capita consumption of that same kind of food went down.

These data point to a pervasive trend throughout the food delivery system: between 1963 and 1971, U.S. per capita food consumption by weight increased overall by 2.3 percent; food packaging weight per capita increased by over 33 percent. *(7)*

Government data show that in the years 1967-1972 jobs in the food packaging industry went down 5 percent *(8)* while the number of packages used for foods and beverages increased by 32 percent *(9)* and net income in the industry went up 30 percent. *(10)*

A consultant's study for EPA concluded that the cost of all packaging (not just packaging for food and beverages) as a percentage of the cost of a consumer product has doubled since 1958. *(11)* Virtually every consumer product that Research Triangle Institute (RTI) surveyed showed significantly increased packaging costs, costs that are thought to reflect both increased use of packaging materials and new design features that enhance convenience.

why all this packaging?

The growth of packaging with its subsequent impacts on resource and energy use can be attributed to a number of factors, many of them stemming from what the packaging industry sees as requirements that the "modern" package must fulfill. A report by Arthur D. Little, Inc. (ADL) for the Ad Hoc Committee on Packaging (a consortium of packaging materials manufacturers and users) lists a number of requirements that have led to the tremendous growth of packaging: product protection, product containerization, sanitation, communication, dispensing, unitizing, prevention of pilferage. *(12)* This array reflects obvious transportation, distribution and marketing requirements but also includes more subtle marketing and labor considerations:

☐ In an effort to hold down labor costs, retailers have welcomed increased self-service shopping. Individually packaged, preweighed goods facilitate the display, selection, and purchase of products, thereby reducing the need for sales clerks.

☐ Packaging manufacturers are well aware of the package's roles in marketing. A product with an elaborately-designed or innovative package is far more likely to attract a buyer than is a simply-wrapped product.

☐ The multitude of convenience packages, such as those with individually-wrapped portions, has led to an increase in the number of packages on store shelves, a trend which retailers welcome.

Container proliferation has accompanied industrial consolidation. The pattern in the brewing industry is illustrative. Independent beer and carbonated beverage bottlers around the country are being acquired by large national concerns, a trend reflected in the figures on numbers of breweries. U.S. Brewers Association, Inc. data show a drop from 600 in 1940 to about 100 in 1973, while beer consumption has generally remained stable. *(13)*

Industry says that the closing of local breweries has arisen from business' need to achieve economies of scale in their operations—economies that can be attained through unified national advertising campaigns, easier access to capital and lower production costs. The remaining brewers say that the disposable bottle or can is integral to this new pattern, with its large distribution regions: disposables help keep costs down by eliminating long return trips for empties. Critics of disposables ask for hard data, wondering about the economics of long-haul brewery trucks going home completely empty, instead of filled with empty bottles.

convenience packaging—saving or waste?

The proliferation of so-called convenience packaging—individually-wrapped portions, ready-to-eat foods, pop-top cans—arose ostensibly in response to consumer pressures for such packages. A

Packaging Material Produced	Material Consumption, 1971 (thousand tons)	Total Energy per Ton (1000 BTUs)	Fossil Fuel Energy per Ton (1000 BTUs)	Total Energy Consumed (million BTUs)	Air Poll. (lbs. per ton product)	Solid Waste (lbs. per ton product)
Paper	27,700	40,800	n.a.	1,130,000	84	176
Glass	11,100	15,256	14,500	169,342	n.a.	n.a.
Steel	7,255	29,590	29,000	214,675	242	538
Aluminum	757	196,632	169,000	148,850	CO-2900; particulates—81	789; red mud—3290
Plastics	2,900	37,088	37,000	107,557	n.a.	n.a.
Total	49,712	306,658		1,770,424		

Source: EPA.

Table 4: Energy consumption and waste generation associated with U.S. production of materials for packaging, 1971.

Product/Package	1958 (in pounds per capital)	1970 (in pounds per capital)	Percent Change
Dairy			
Product Consumption	398.0	354.0	−11.1
Package Consumption	10.6	13.3	+25.5
Cereals, Flour and Related Products			
Product Consumption	150.0	140.0	− 6.0
Package Consumption	0.8	0.9	+12.5
Produce			
Product Consumption	90.2	80.0	−11.3
Package Consumption	5.3	7.3	+37.7

Source: EPA: OSWMP Second Report to Congress on Resource Recovery and Source Reduction. Packaging data supplied by Research Triangle Institute under EPA Contract No. 68-01-0791; Product consumption data derived from U.S. Department of Agriculture, *Food, Consumption, Prices, Expenditures,* Washington, D.C., 1972.

Table 5: Product consumption in relation to packaging consumption, 1958-1970

former president of the Glass Container Manufacturers' Institute put it this way: "Consumers . . . want, need and demand the convenience of the nonreturnable container. . . . One result of this has been a marked increase in the per capita use of all types of packaging." *(14)* The ADL study points to changes that encouraged development of new and increased packages. *(15)*

☐ **Demography** The post-World War II movement to suburbia has meant the growth of large population centers with increasingly affluent residents whose demand for more products (and hence, more packaging) has increased.

☐ **Disposable income** As income levels around the country rise, more money is available for "discretionary purchases and higher quality necessities," items that generally come heavily-packaged and containerized. *(16)* The higher costs of many convenience foods would presumably be absorbed by higher incomes.

☐ **Family structure** Increases in the number of women working affect packaging. As women, who have traditionally been the makers of meals and buyers of food, enter the labor market, they have less time available to prepare meals, and food packagers and processors have found a market for more ready-to-eat foods. *(17)*

Industry says consumers prefer convenience foods and packages despite their higher prices. *(18)* One reason for this preference, according to industry, is that there is less product waste with smaller packages. In the matter of package size, however, the large household may prefer large-sized packages, and the household that does prefer small quantities may have no choice except to purchase over-wrapped convenience packages.

Industry cites a second reason that convenience foods and packages are preferred: they diminish generation of solid waste. The food is already prepared and the consumer does not have to dispose of food preparation wastes (such as corn cobs, nut shells, etc.). More packaging, the companies say, means less food spoiled. One industry supplies data to support its claims: in New York City, food packaging is said to eliminate 600 million pounds of potential food wastes because prepared or frozen foods are delivered in "sanitary frozen food packaging." *(19)* As a result, New York City's disposal requirements are cut to only 30 million pounds of such packaging rather than 600 million pounds of food wastes. *(20)*

Packaging in itself does not, however, reduce food wastes but

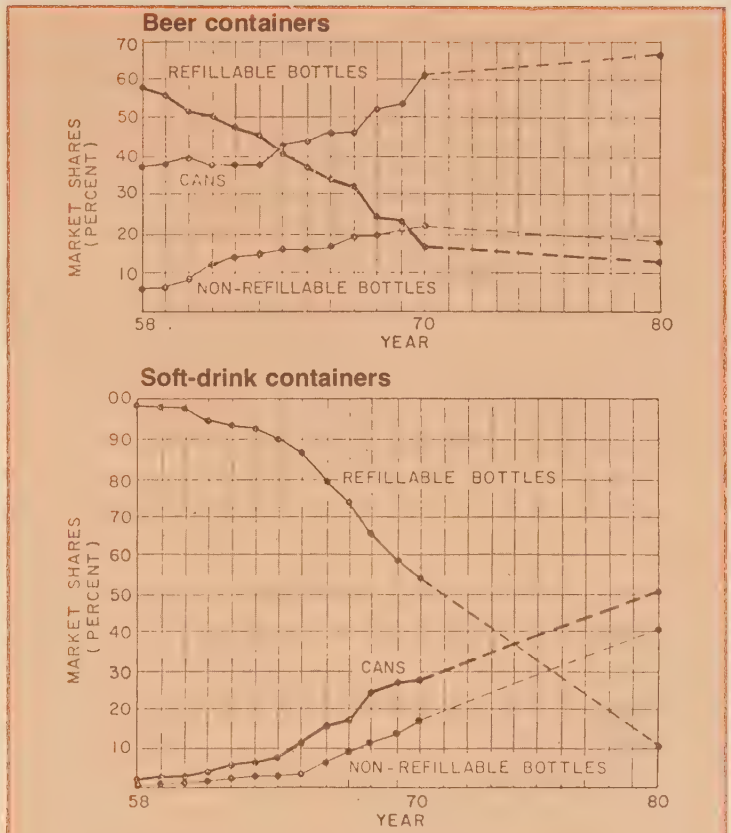
simply relocates those wastes to the factory. The former head of New York City's Environmental Protection Administration, Jerome Kretchmer, once remarked at Senate hearings on solid waste, "I will take a thousand banana stalks for every thousand plastic trays on an even up basis, one for one, any day you want to give them." He pointed out that food wastes, be they banana peels or fish heads, decompose in the land, and even add nutrients to the soil, while the plastic trays do not degrade and therefore require another form of disposal. *(21)*

beverage containers

Most discussion of source reduction eventually focuses on one particular segment of the packaging and container field—beverage containers, especially those for carbonated beverages and malt liquors. (Milk and wine bottles have only recently come under scrutiny.) As a matter of fact, interest in source reduction has almost always stemmed from the beverage container issue, because containers are one of the most conspicuous examples of trash, litter, and resource waste. And it is beverage container policy that has evoked the most bitter controversy; controversy that promises to continue as the Congress and state legislatures around the country consider returnable bottle legislation.

While returnables have been in use for years—and, indeed, until the late 1950s were the only containers in which one could purchase beer or soft drinks—their use in recent years has diminished drastically, replaced by one-way cans and bottles. Figure 2 illustrates the dramatic decline in the use of returnables for soft drinks and beer.

The proliferation of disposable containers springs from the same conditions that explain the explosive growth of "convenience" packaging: throwaways facilitate retail store convenience, make disposal easier for the consumer, and minimize bottlers' and retailers' costs by reducing container handling. But there are other, less obvious reasons as well, all of them connected with the consolidation trend in



Source: EPA; Research Triangle Institute

Figure 2: Market Shares by Container Types

the beer and carbonated beverage industries. While these industries, and breweries in particular, have been growing in size and shrinking in number, per capita consumption of beer and soft drink containers has outstripped both population growth and per capita consumption of beverages. To illustrate, between 1959 and 1969, on a per capita basis, consumption of beverages rose 29 percent while beverage container consumption rose 164 percent. In the same period, the average number of fillings per container declined from 3.7 to 1.8. *(22)*

If we break down beverages into two categories—soft drinks and beer—we see that in the soft drink market, returnable bottles have held a continually diminishing role (from 53.7 percent in 1969 to an estimated 34.9 percent in 1978), while, if present trends continue, aluminum cans alone will have increased almost tenfold during that same period, from 1.5 percent in 1969 to 10.5 percent in 1978. *(23)* By 1985 the situation will worsen: beer in returnable bottles, 27 percent of the market in 1969 will have slipped to an estimated 17.6 percent while beer in nonreturnable aluminum cans is expected to increase from 7.1 percent of the market in 1969 to 40 percent in 1985. *(24)*

The sheer volume of beverage containers has not by itself precipitated interest in returnable beverage containers; rather, this interest has come from the great impact of throwaways on the solid waste stream, on litter, and on resource consumption. EPA says that of the estimated 125 million tons of municipal wastes discarded in 1972, about 8.8 million tons (almost 7 percent) consisted of discarded beer and soft drink containers. *(25)* If they went straight into the wastebasket or garbage can, perhaps they would not be so much the target of citizen and government action as they now are. But about one container in four makes an intermediate stop, as litter on the landscape.

A number of studies document the role of different container types in litter. A Research Triangle Institute (RTI) study for EPA concluded that of the 2.2 billion littered containers in 1969, 71.3 percent were beer containers, 25.7 percent were soft drink containers, and 3 percent were liquor bottles. Furthermore, of those containers, 73.1 percent were cans, 17 percent were one-way bottles, and 9.9 percent were returnable bottles. The RTI study goes on to say that beverage containers constitute between 20 and 32 percent of all roadside litter by *item* count, while the Oregon State Highway Department states that beverage containers constitute about 62 percent of all litter by *volume* count. *(26)*

Industry complains about people zeroing in on beer and soft drink containers and suggests instead a focus on milk containers. Environmentalists, however, point to the disproportionate volume of the former in litter; milk containers (and there are 40 billion of them discarded annually) do not show up as litter and are therefore less visible to the public. *(27)*

Noisy and visible as anti-litter campaigns themselves have been, many proponents of waste reduction at its source look beyond litter abatement needs to other benefits from returnables. With continuing energy and raw materials shortages, the resource ramifications are generating most of the interest.

EPA estimates that it took 6.2 million tons of glass, 2 million tons of steel and .6 million tons of aluminum to turn out the 8.8 million tons of beer and soft drink containers used in 1972 (the low figure for aluminum can be attributed to its light weight). *(28)* EPA's data also shows that beverage containers as a whole consumed 45 percent of all glass produced in the U.S., 2 percent of all steel, and 6 percent of all aluminum. *(29)*

The environmental impacts of the five major beverage container types is shown in Table 6.

The conclusions, to be drawn are self-evident: a returnable glass bottle uses less energy (even counting in the energy needed to transport the empties back to the bottler for refilling) than any other container type; it uses less water in its manufacture; it produces less air and water pollution and produces fewer industrial solid wastes.

A later chapter will examine just how significant these savings are.

Environmental Impact	10-trip† returnable glass bottle	all steel can	bi-metallic can	one-way glass bottle	aluminum can
Energy (million BTUs)	24*	41	57	72	91
Virgin Raw Materials (lbs.)	1538	2029	1677	7515	578
Water Volume (1000 gals.)	11	38	34	37	16
Waterborne Wastes (manufacturing) (lbs.)	45	349	335	68	249
Atmospheric emissions (manu.) (lbs.)	111	157	234	328	381
Post-consumer solid wastes discarded (cubic feet)	12	4	3	41	3
Industrial Solid Waste (lbs.)	8	71	61	32	29

Source: EPA, OSWMP, Second Report to Congress on Resource Recovery and Source Reduction. Preliminary data prepared by Midwest Research Institute for U.S. Environmental Protection Agency, Office of Solid Waste Management Programs, under Contract No. 68-01-1848.

Notes: —All containers are 12 ounce size.
—The bottles are capped with steel closures.
—Solid bleached sulfate paperboard carriers are included with bottles
—Plastic ring type carriers are included with cans.

*Includes energy used to return empty bottles to store.
†The ten-trip figure was chosen by the Midwest Research Institute as the most representative number of trips for returnables today. Resource and Environmental Profile Analysis of Nine Beverage Container Alternatives, Final Report, EPA 1974, p. 2.

Table 6: Comparison of five different containers for delivering 1,000 gallons of beverage

4. approaches to source reduction

We believe that the nation should not wait for a crisis before changing attitudes on effective utilization of materials. Improving the service performance of materials must be a national goal because the extension of service life of a product stretches the supply of materials, since it reduces the number of units required per year, reduces the growth in the recycling load and thereby the impact on the environment, reduces energy demand, and may reduce needs for raw material imports.

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tools for control

Any mandatory source reduction measure—whether it is directed to an old washing machine or an empty bottle—represents a form of product control, a measure that, according to EPA, is necessitated by "supposed failures of private market decisions to evolve socially optimal product designs including consideration of factors such as product durability, repairability, ease of material recovery or waste disposal costs." *(1)* Not all waste reduction measures come about through government controls; some are the individual decisions of industries—those facing resource shortages, for example. But most of the impetus for waste reduction comes from the potential for or the threat of government action in the form of laws or regulations.

What EPA is suggesting is that some form of intervention in the marketplace may be appropriate, to alter products that do not meet current environmental or other requirements. Examples of existing product controls, though not predicated on solid waste management goals, include federal regulation of pesticides and herbicides, pharmaceuticals and toys.

Assuming, then, that some product controls (defined by EPA as "any public policy to regulate the quantity or consumption characteristics of a product") *(2)* are necessary and desirable, major problems arise. Which products, durable or nondurable, should be subject to source reduction measures? How specific should such measures or regulations be? Who should answer these questions? If applied to a specific product, regulations could be construed as discriminatory because other products equally damaging or resource intensive would remain unregulated. But if controls are applied to a product class, regulation and enforcement could become an administrative nightmare and could dramatically affect major industries.

EPA has tried to eliminate some of the subjectivity surrounding targets for potential waste reduction by establishing criteria to determine the need for regulatory measures. *(3)* These include:

☐ **Materials scarcity** Are the raw materials used in a product's manufacture scarce or high-priced? Are less scarce materials available that could be used instead? If raw materials are indeed rare, some form of product control may be justified.

☐ **Materials and energy intensiveness** Does manufacturing a product consume large quantities of resources? Is it possible to substitute other processes or other materials that are less resource-consumptive?

☐ **Product disposability** Does the composition of a particular item make it hard to dispose of? Does it place a burden on disposal systems or on the environment? If so, are there substitute products or product components that would make disposal easier?

☐ **Product life and reusability** How long-lived is a product? Can it be reused? Are other longer-lived or reusable products available as adequate substitutes? Can the product be redesigned for longer life or reuse?

☐ **Pollution intensiveness** Does manufacture of the product entail disproportionate amounts of pollutants? If so, are there substitute products that generate fewer pollutants or residues?

In each of these instances, product regulation may be appropriate if there are manufacturing or design methods for an alternative product. In some instances, however, product controls may be necessary even if no readily available substitute product exists, e.g. when a product threatens health.

Assuming a need for reducing waste at the source, there are two basic routes for change: product reuse and product redesign. Each requires changes—changes in design, changes in manufacturing, changes in marketing and distribution.

In the first instance, product reuse, an item is simply refilled (in the case of a container) or resold after its initial use. Reuse implies that the item is utilized again in its original configuration; reuse makes reprocessing of the waste product unnecessary. Items that can be considered reusable include refillable beverage containers; shopping bags; cloth towels, napkins and diapers; and refillable pens, lighters and the like.

In product redesign the manufacturer changes the configuration of an item so that it uses less material or energy or to make it more easily repairable, longer lasting, or less susceptible to superficial or style changes. Examples include steel-belted radial tires . . . simplified packaging . . . screwtops, adaptable for home canning, instead of lift tops for glass jars . . . less complicated control panels on appliances . . . development of a lighter-weight returnable bottle.

Once product reuse and/or redesign—even elimination, in rare cases—is determined to be desirable or necessary, how can these changes be brought about? Government has roughly four categories of tools at its command: taxes and charges; deposits; bans; and regulation of the characteristics of a product—or a mix of these. At the volunteer level, change is possible through self-imposed decisions by citizens or by industry and through education programs instigated by government, industry or citizens. All the approaches can be applied to most components of the solid waste stream.

taxes and charges

Levies—whether taxes or charges—based either on product weight and life or on the use of a particular material in manufacturing can be used to subsidize the disposal of a waste item or to pay for pollution abatement. The rationale for levies of this sort (not to be confused

with deposits and refunds) is that the environmental cost could and should be made part of the product price. Consumers would presumably choose to buy untaxed substitute products (ones that are more environmentally sound) to avoid the higher price tag on the taxed item. Anticipating this consumer decision, the manufacturer would presumably make other choices—less environmentally damaging ones—too.

The problems surrounding charges of this sort stem from the point at which the charge is levied. The pitfalls of a weight-based tax are nowhere better exemplified than in debate over the penny-a-pound tax. The suggested charge, based on an average waste disposal rate of $20 per ton, or 1¢ per pound, would in theory be levied on producers (and inevitably passed on to consumers) and would pay for expanded waste collection and disposal by the taxing authority. At the same time, however, it would prompt a manufacturer to substitute lighter materials to decrease the tax payment.

It is important to remember that the weight of an item is not an accurate indication of its potential for environmental damage or its resource intensiveness. The replacement of glass bottles, for example, by those made from polyvinyl chlorides (PVCs) might mean a lower weight-based tax on the containers, but the lower charge would do nothing to compensate for or minimize the hazards associated with use of vinyl chloride, a known carcinogen. The penny-a-pound charge might also mean increased use of lighter materials with shorter life-spans which might have an *adverse* impact on source reduction (see page 21). In those instances where taxes would encourage longer product life or increased durability, such charges might increase the initial cost though not the total-life cost of the article.

deposits

Another source reduction tool is the mandatory deposit on certain products to encourage reuse. Under this system, the consumer pays an additional fee at the time of purchase, a fee refunded when the empty or used product is returned for reuse, refill, or repair. It should be noted that a deposit system works *only* when there is a mechanism by which returnable packages or products can be efficiently collected and then accepted by the manufacturer or bottler for reuse.

Beverage containers and retreadable tires are two products suitable for a deposit system. For both, however, establishing the return system can be logistically difficult.

bans

An outright prohibition on the manufacture of certain products or on the use of certain materials in a product is a third way of reducing waste generation or materials use. But experience with government bans for health and safety reasons shows that overwhelming evidence is needed to sustain them, especially if substitutable products are not available (e.g. the government ban of DDT, with subsequent temporary modifications in the summer of 1974 due to pest infestations). Because they have tremendous impact on the industry involved, bans can only be used selectively. To the economist, a ban is appropriate only when the damage from even a small amount of one product plus the cost of regulation outweigh the benefits from the small use plus the administrative cost of implementing the ban.

design regulation

Taxes and bans are reactive measures. Regulation is a different route by which to bring about changes in product and package design. Mandatory design control means that a regulatory authority establishes specifications, in advance of manufacture, that particular products or product classes must meet. These can be aimed at increasing durability, repairability, or reuse; or the goal could be to reduce resource intensiveness or lack of disposability. Although there are few, if any, instances of design regulation based on conservation goals, such regulation could conceivably be applied to large items of waste. Requiring a manufacturer to produce a refrigerator whose doors can be replaced, for example, is a form of design control.

Many people see design control as a desirable way of regulating products because government intervention does not interfere with marketing practices but instead is limited to an action before the product is even made. For many in industry, however, design regula-

tion is a threatening prospect because it places government in a realm that has traditionally belonged to industry alone. The chairman of the board of one of the nation's largest beverage companies has termed such intervention "dictatorial." *(4)* Just as many industries have reacted negatively to regulatory actions by the Federal Trade Commission, the Food and Drug Administration, the Consumer Product Safety Commission and EPA, they can be expected vehemently to oppose federal efforts in solid waste reduction through product redesign.

voluntary measures and education

Many in government and industry say that the most desirable way of reducing waste generation and conserving materials and energy is through voluntary efforts—educating citizens and persuading and encouraging industry to redesign products.

A number of citizen organizations and industries publish hints for consumers and businesses on ways of cutting down wastes and make such publications available to the public. Voluntary efforts rely on widespread cooperation and a high level of citizen interest.

Government efforts to influence industry in terms of packaging and product design have met with some success, but the newness of such programs makes it difficult to evaluate the efficacy of "jawboning." (For further discussion about industry's voluntary efforts, see Chapter 6.)

While trends to redesign containers are a response to skyrocketing costs of raw materials and energy, some industries are also becoming somewhat sensitive to the growing interest in reduction of waste at source. The prospect of government regulation makes voluntary guidelines, drawn up by government and industry working together, appear more palatable to many manufacturers. The one difficulty arising from voluntary guidelines is that the industry that chooses to observe such guidelines may be placed at a disadvantage in terms of product prices and labor costs, disadvantages that might spell the failure of voluntary measures since no industry will knowingly undertake programs detrimental to its business.

Criticism leveled at voluntary efforts stems primarily from the belief of many economists that voluntary measures can have only limited usefulness. Critics acknowledge the successes of voluntary energy conservation programs in 1973-74 but say that a more fundamental change in consumption habits can come only when conservation programs are mandatory or when those who conserve are rewarded for doing so. In addition, most source reduction efforts are directed to citizens, who are exhorted to change their consumption habits. Many people feel that industry, too, must change its consumption pattern, but economists think substantial change will occur only when government establishes a cost environment in which business interests and social interest coincide.

policies for specific products

Virtually all waste reduction measures rely on one or more of the five approaches referred to previously. Which are most apropos in a given case depends, of course, on the product that is to be regulated. EPA estimates that source reduction measures could be applied to five product categories of the solid waste stream: containers, packaging, appliances, newspapers and miscellaneous items (including disposables and tires). Table 7 shows the volume of each waste product category and the source reduction measure that could apply. (It should be noted that although alterations in materials use and product life are considered as one item—product redesign—in this publication, they are treated separately in the chart.)

durable goods

Among the wide range of durable goods, tires and major household appliances have been identified as especially suitable targets for redesign, with source reduction as a goal.

The most obvious way to reduce the number of tires we discard is to use tires that will last at least twice as long. Steel-belted radials, which are generally guaranteed to last for at least 40,000 miles, have almost doubled the lifetime of most standard bias-ply tires, and efforts are now underway to develop a radial that will last 80,000 miles. The magazine *Environmental Action* reports that according to a researcher at the University of Pennsylvania we could eliminate

75 percent of all tires discarded each year by extending tire life to 100,000 miles. *(5)* OSWMP believes that the number of tires discarded annually could be realistically reduced by 60 percent. *(6)* It should be noted that while the initial cost of radials is higher than that of bias-ply tires, total-life cost is expected to be less (see Chapter 5).

EPA estimates that a variety of waste reduction measures (primarily those relating to product durability) could reduce discards of major appliances by 10 to 15 percent. *(7)* However, it is difficult to ascertain and quantify just what an acceptable service life for a product should be. Rising prices and reduced consumer buying power extend the life of durables: many consumers cannot afford or will not pay the high price of new goods, especially appliances. Instead of discarding them, they are having older products repaired.

Although automobiles are not included in the durable goods category, they represent an example of how waste reduction can come about through product redesign. Unlike trends of the 1950s and 1960s, when each new car season was heralded by extravagantly different models, car manufacturers have made fewer dramatic design changes in new models in recent years. The similarity from year to year has meant that consumers are less likely to base their decision to buy a new car on external cosmetic considerations.

nondurable goods

As stated previously, nondurable goods—comprising 18 percent of the municipal waste stream (see Figure 2)—present fewer problems for waste disposal than do packaging or durables. The relative ease of disposability, combined with the fact that recycling of newspaper and office waste paper is far more widespread and lucrative than are other forms of recycling (although also subject to highly volatile markets), make this waste category less likely to require institutionalized source reduction programs. Most actions directed towards these products come from consumers. Many people are returning to cloth napkins instead of paper napkins, handkerchiefs instead of tissues, cloth instead of paper towels, dishware instead of paper plates and cups, and cloth rather than paper diapers. The convenience of many disposables, however, virtually guarantees

Product	Weight in Waste (millions tons)	% Municipal Waste[1]	% Product Waste[2]	Applicable Measure Reuse	Mat. Use	Life
I. Containers						
Beer and Soft Drink[3]	8.0	6.4	10.4	X	X	
Non-Beverage Glass[3]	6.2	5.0	8.1		X	
Non-Beverage Cans[3]	3.8	3.0	4.9		X	
Rigid Boxes[4]	2.3	1.8	3.0		X	
Prepared Beverages[4]	1.4	1.1	1.8		X	
Milk[4]	1.2	1.0	1.6	X	X	
II. Packaging						
Corrugated Shipping[5]	10.0	8.0	13.0	X	X	
Meat[4]	1.8	1.4	2.3		X	
Fast Food[6]	1.3	1.1	1.7		X	
III. Appliances[5]	2.0	1.6	2.6			X
IV. Newspapers[5]	10.3	8.2	13.4		X	
V. Other Products						
Disposable Products[5]	2.6	2.1	3.4	X		
Tires[6]	2.0	1.6	2.6	X		X
Total	52.9	42.3	68.7			

[1]Total municipal waste in 1971 was 125 million tons.
[2]Total product waste in 1971 was 77 million tons.
[3]Weight in waste for 1972 based on Midwest Research Institute, "Base Line Forecasts of Resource Recovery," Draft study.
[4]Weight in waste for 1970 based on Research Triangle Institute, "An Evaluation of the Effectiveness and Costs of Regulatory and Fiscal Policy Instruments on Product Packaging," 1974.
[5]Weight in waste for 1971 based on EPA, "Second Annual Report to Congress," 1974.
[6]Weight in waste for 1972, EPA estimate based on industry data.
Source: Resource Recovery Division, OSWMP.

Table 7: Targets for source reduction

some continued use. It appears that only high prices will divert people from purchasing throwaway goods.

packaging and containers

A variety of ways have been suggested to curtail the abundance of packaging (bottles, boxes, cans, cartons, wrapping, etc), including greater use of larger or reusable packages and less use of packaging materials. Measures to make packaging expensive or to encourage manufacturers to use less include taxes on package weight, a unit tax on rigid containers, a deposit or bounty on reusable packages or containers, and bans or taxes on disposable packages.

The greatest problem for policy-makers and legislators seeking to control proliferation of waste is determining which strategies, if any are most appropriate to a particular packaging type. Those problems echo the difficulties associated with virtually every source reduction measure: What constitutes overpackaging or excessive materials consumption? How should a package be singled out for ameliorative action? Should source reduction be applied to all packages or to a specific package type?

The entire issue of overpackaging is subject to much debate. Individual perceptions of what constitutes excessive packaging vary widely. Many people believe, for instance, that packaging of cosmetics and perfumes is a prime example of excessive packaging. Multilayer, multi-media containers (a carton *and* cellophane, for instance) are used primarily to attract consumers, to glamorize a product. Packaging, and not the product delivered, has become the "gimmick" that attracts the buyer.

Granting that industy is right in saying some multi-layered packaging is necessary for product protection, we can still assume that excessive packaging does exist. According to the guidelines issued by EPA, packaging may be considered as excessive if the materials used are in short supply, if the amount of energy required is great in relation to substitutable forms of packaging, if materials are difficult to dispose of and more satisfactory alternatives are available, or if the packaging impedes consumer use of a product (by being difficult or hazardous to open, for example).

Criticism arises when source reduction measures are directed at a particular package rather than a particular class of packages. This dilemma is nowhere better illustrated than in the continuing controversy over beverage containers. When beverage containers were singled out as almost the sole target of source reduction legislation introduced in the U.S. Congress, many in industry attacked the proposals as unfair and discriminatory; they suggest that it is ludicrous for environmentalists to ignore other forms of packaging or even other durable goods that may be just as burdensome and just as resource intensive. Nevertheless, throwaway bottles and cans still attract the most attention and evoke the strongest and most acrimonious debate.

A number of ways have been suggested to reduce packaging volumes:

Use of larger (and hence fewer) packages A trend to larger packages and containers could reduce significantly the amount of materials and energy consumed by packaging. EPA estimates, for example, that canning all tomato juice in 1971 in containers of 1 quart or larger would have reduced steel consumption for that particular container type by almost 20 percent. *(8)*

Assuming that similar savings could be achieved for other packages, what would be the impacts of reduced convenience packaging? Consumers would find that the cost per unit of delivered products would decline, but they would also be faced with more limited choices in the unit sizes available. Initially, industry would be affected. Materials suppliers would sell less; package makers would produce fewer containers. Product manufacturers would make a lower dollar volume of sales only if consumer purchasing dropped as a result of decreased product choice. Distribution and transportation industries would be affected, too, although most changes would center on methods of storing and delivering goods. Eventually, industry might benefit as consumer savings are re-spent.

Use of fewer layers and coverings in packages Proponents say that this policy would be directed to those packages that are considered truly excessive—particularly cosmetics, perfumes and luxury

items. Few studies have been conducted, however, that quantify the resource or energy savings available through elimination of superfluous packaging, and many people believe that such reductions would have primarily a symbolic value. The effects of fewer packaging layers would vary: consumers would not be affected at all, except, perhaps, in terms of satisfaction accompanying the purchase of an elegant package. Materials suppliers would sell less to package manufacturers who, in turn, would produce fewer containers. It is possible that product manufacturers' sales would decline minimally.

Reuse of packaging EPA estimates that 90 percent of all packaging by weight is discarded within one year of initial purchase. *(9)* This figure suggests that reusable containers (for example, cartons and bottles) would eliminate a large amount of packaging waste and would also reduce the resource consumption and environmental impacts of much packaging. It is estimated that reusing 1,000 tons of corrugated containers five times would use 80 percent less energy, produce 57 percent less air pollution, 98 percent less water pollution, and 77 percent less solid waste than producing and using single-use corrugated containers. *(10)* Studies also indicate comparable savings with use of refillable beverage containers.

These benefits notwithstanding, the legal, technological and economic impacts of reusable packaging must also be considered. There has been little research on expanding use of returnable packages and containers except, of course, for certain beverages (beer, soft drinks and milk). Some state laws prohibit refillable containers for certain food products. Technologies to produce returnable containers that meet industrial needs as well as federal and state laws are limited, and industry is reluctant to undertake such research and development. In addition, use of returnable containers requires that some system for container return and reuse be initiated, perhaps an incentive system (such as refund of consumer's deposit) or a separation system (where the householder sets out returnables for pick-up and refilling).

Those who grew up when doorstep milk delivery in glass bottles was the norm, when returning soft-drink bottles to get the deposit refund was every youngster's idea of supplemental income, tend to think that such systems could work. Those who have grown up since these homely "separation systems" and "incentives systems" ceased to be, or who are economically tied into later arrangements, express doubts about their workability.

Economic impacts would be serious, since virtually all segments of the industrial sector, including retailers, would be affected by returnable container systems. EPA anticipates changes in production and sales volumes, in employment, in capital investment requirements, and in the precipitous obsolescence of existing plant equipment.

How can any of the three packaging shifts be implemented? What incentives or prods can be directed to consumers or industry to signal a move towards less packaging or reusable packaging? Two types of measures—fiscal and regulatory—can be considered.

☐ **Fiscal measures** Taxing packages and containers by weight (see page 16) or unit can somewhat decrease materials or energy consumption in packaging, alter materials used for packaging, or encourage reuse of packages. EPA says that the penny-a-pound tax would reduce the weight of discarded packaging by only about 4 million tons each year, a reduction of less than 6 percent in total annual packaging discarded; current energy use for all packaging could be expected to decline by 1 or 2 percent. A unit tax (i.e. a uniform tax on each package, regardless of size or configuration) is expected to have slightly greater impacts on source reduction—estimated reductions in packaging waste of 4 to 5 million tons each year, based on a 1¢-per-unit tax. *(11)*

Each approach tends to discriminate against one or another kind of package. As explained earlier (see page 16), package weight is not an accurate indicator of environmental insult. A tax on packaging weight would be higher for a returnable glass bottle than it would be for an aluminum can, despite the fact that the former is far more environmentally sound and resource-conserving than the latter. The unit tax, while it avoids the weight pitfall, ignores the dissimilar

impacts from different packaging types.

☐ **Regulatory approaches** Regulating individual packages according to their specific or peculiar characteristics avoids the problems inherent in taxes but raises new problems relating to the regulatory authority and capabilities of government. The specter of a bureaucracy that must examine every single package type (and ADL estimates that there are more than 100,000 different ones available) *(12)* has tended to offset interest in any possible benefits from direct regulation of certain packages. As a later chapter will indicate, however, one state, Minnesota, is attempting to do precisely that.

beverage containers

There are essentially three ways to control the types of beverage containers used: through mandatory deposits, through bans on nonrefillables, and through litter taxes. A general discussion of the pros and cons of these three options can be found on page 00. This discussion will explore more specifically the effects of each.

In a **mandatory deposit** system, cans are not banned, but the retailer is required to charge a deposit on any beverage container purchased and to pay the consumer a refund on any returned beverage container, whether refillable or not. The retailer then gets a refund from the distributor when returning the container for possible refill. Though this system does not compel distributors or bottlers to refill containers (they could still discard the returned cans and bottles), economists say that distributors would use refillable containers because it would be unprofitable for them to pay the refund on a throwaway, dispose of the container and then buy an entirely new container.

A variation of the mandatory deposit concept, what might be termed a mandatory refund system, has been used in Oregon. The Minimum Refund Act requires that all beer and soft drink containers carry refunds, which vary in amount, depending on the container's reusability. Standardized bottles with paper labels (reusable by more than one manufacturer) have 2¢ refunds, while returnable bottles with permanent brand identification (reusable by only one manufacturer), carry 5¢ refunds. Nonrefillable beverage bottles and cans also carry a 5¢ deposit. Deposits are not required by the law, but it is assumed that they will be added to the price of a beverage to cover the cost of the refund that the retailer must pay to the purchaser and the distributor to the retailer. The law requires that the refund value be clearly marked on each container. Flip-top openings on cans are prohibited.

The Oregon law promotes returnable refillable beverage containers because the distributor—the final refunder—is unwilling to repay retailers for containers that cannot be used again. If he chooses to continue use of nonrefillables, he will eventually have to raise the price of the beverage to cover the cost of the refund he pays out. Higher prices would probably make his beverage less competitive in the market.

Banning nonrefillables prohibits use of any beer or soft-drink container that cannot be refilled. This system eliminates cans and lightweight one-way glass bottles from the market, because neither can be refilled safely, using existing technologies. Outlawing nonrefillables does not necessarily mean that a deposit/refund system must be used, but the bottler tends to levy deposits on beverages to ensure that the container is returned for refill.

Vermont enacted a mandatory deposit law in 1972 (effective 1973) differing from the Oregon law in that it requires a 5¢ deposit on all beer and soft drink containers whether refillable or not. In April 1975, the state legislature voted to strengthen the law by outlawing nonrefillable bottles, flip-top cans and plastic binders. When this law goes into effect, Vermont will become the first state to have largely banned nonrefillables.

The third approach, a **litter or packaging tax,** places a nonrefundable tax of about ½¢ on a beverage container, payable by the initial container purchaser, (bottler or canner) and probably passed on to the consumer. Taxes collected are used to finance litter cleanup. Many people consider this approach, the one used in Washington state, to be least desirable because it does nothing to curb litter or reduce the volume of solid waste generated; rather, it simply finances clean-up *after* the littering occurs. Most important, however, it does nothing to reduce the materials and energy used to make nonreturnable, nonrefillable beverage containers.

5. impacts of source reduction

Why should one segment of an industry be subsidized for maintaining a distribution system that is ecologically unsound, unnecessarily expensive to both consumers and taxpayers, and not in the best interest of the industry as a whole?

N. E Norton, President
Dr. Pepper-Royal Crown Bottling Co.
Corpus Christi, June 13, 1974

Just as other environmental considerations have come under fire in recent months because of alleged inflationary impacts, so also have source reduction programs been subject to attack. Arguments against product standards and regulation revolve around the effect of such regulation on employment, on consumer prices, and on industry investment and operations. As a result, the conservation benefits of waste reduction have been obscured by emphasis on its potential economic impacts.

The *philosophical* argument against waste reduction is based on the inadvisability of government interference in the marketplace. Such intervention is said to be acceptable *only* when there is overwhelming evidence demonstrating that a product is dangerous to society. The lengthy debate over health hazards from cigarettes is proof of the difficulties of reaching agreement about what constitutes such evidence. Since harmfulness is generally thought of in health-related terms, there is little if any precedent for enacting stringent laws or promulgating rules based on an argument that a product is a danger to society because it uses up too much of our energy or resources or because it is hard to dispose of. Spokesmen for industry say that, far from burdening society, many products, especially containers and packages, help society and are an integral part of maintaining what industrialists define as a high standard of living. Should energy or materials conservation become necessary, industry says it will take appropriate action without government interference.

What makes it ever harder to quantify the impacts of product regulation is that most studies on source reduction have addressed the resources issue; relatively little work has been completed on economic impacts. Moreover, many of the studies have focused on very specific and limited source reduction measures—on beverage containers in particular—making generalization difficult.

There are three major areas on which source reduction measures could have impact, both positive and negative: resources and energy, solid waste programs, and the economy.

resources and energy

It appears likely that product regulation programs for durable goods could produce worthwhile energy and materials savings, but little research has been carried out to demonstrate exactly what they would be. It also appears that any savings would be felt in the long run only, because the transition to use of those changed products would occur only gradually, as existing products wore out and were replaced.

More data, however, is available about packaging. It appears that if controls for packaging and containers were put into general effect, we could immediately get some significant savings: reduced use of energy and materials at both the source and the disposal ends of the consumer goods stream.

How significant? EPA estimates that a national system of returnables—to cite only one kind and category of product control—would have saved 244 trillion BTUs in 1972. *(1)* While soft drink and beer container energy consumption represents less than 1 percent of total annual U.S. energy consumption, Bruce Hannon of the Center for Advanced Computation at the University of Illinois says that the annual energy now diverted into supplying beer and soft drinks in throwaway cans and bottles would supply all of the electrical needs of Pittsburgh, Boston, Washington, D.C. and San Francisco for about 5 months, or 30 billion kilowatt hours. *(2)* And a physicist at Dickinson College, Priscilla Laws, adds that the potential energy savings from a returnable system would provide all the residential electricity for 11 million relatively affluent persons. *(3)* With the rising

consumption curve that is projected by industry, potential energy savings would hit 421 trillion BTUs in 1980 (see Tables 8 & 9). *(4)*

When it comes to packaging other than beverage containers, equally important savings are possible. If this category of packaging consumption could be whittled back to the per capita levels of 1958, we could save 16.5 million tons of raw materials and more than 753 trillion BTUs in 1980—without any paring of expected growth in use of the products packaged (see Table 10). *(5)* What would it take to get back to that 1958 level? EPA estimates that packaging would return to 1958 levels if we made the maximum possible reduction in *excess* packaging, still allowing for adequate product protection.

EPA estimates that had we held *all* packaging in 1971 to 1958 per capita levels, the United States would have saved more than 566 trillion BTUs, the equivalent of 267,000 barrels of oil each day—equivalent to .8 percent of total *primary energy use. (6)* EPA also says that despite an anticipated increase of 2.8 percent in packaging consumption rates between 1971 and 1980, cutting packaging back to 1958 levels will still save twice the energy that could have been saved in 1972—almost 1,200 trillion BTUs/year or 555,000 barrels/oil/day (see Table 11). *(7)*

The question that naturally arises is, Why 1958? That year is used as a baseline because it marks the start of the packaging explosion. Those who question its use as a target ask, How realistic is it to think of returning to 1958 packaging level? They say that packaging has expanded so far beyond what it was then that its use as a baseline is meaningless.

Representatives of industry say that reducing packaging would represent a step backwards from our high standard of living and in the end would cost the consumer more due to increased manpower costs for retailers, changes in plant machinery, etc. Industry suggests that its own technologies, rather than the constraints of any product regulation, will reduce energy and materials consumption. To substantiate that claim, American Can Company, pointing to its own data, states that "energy consumed by each packaging system will be significantly reduced by 1980." *(8)* Table 12 shows American Can's projections of anticipated energy use. The savings, which vary from minimal (in the case of the returnable glass bottle) to large (the aluminum 2-piece can), are attributed to a number of factors, including reduced use of raw materials per million units (15-20 percent); resource recovery systems that process 50 percent of collected wastes through recycling plants; use of new container manufacturing technologies (water-based and ultraviolet-aired coatings to minimize energy consumption); and reduced use of paperboard (through elimination of paperboard outerpackaging for metal and plastic containers). *(9)*

American Can's conclusion is that source reduction measures such as beverage container legislation are superfluous, since the energy used by one type of can (steel: drawn and ironed containers) is comparable to returnable glass bottles. The company ignores, however, the other benefits derived from use of returnables—reduced raw materials depletion, reduced air pollution and reduced solid waste generation. And, as will be discussed later, there is some doubt as to the validity of 50 percent recycling levels (see page 27).

In addition to technological developments, many industries claim that certain packages do not strain resource supplies. Those who manufacture or utilize paper packaging say that paper packages should not be targets of packaging reduction measures because forests are renewable resources. Since paper supplies are therefore not subject to the effects of geopolitical actions—embargoes, for example, or cartels of producers—they say there is simply no reason to curb paper packaging. Even if one accepts these assertions, reducing paper consumption to 1958 levels would still mean significant energy savings.

solid waste management programs

The proliferation of short-lived or disposable products has drawbacks other than consumption of resources and energy. Local governments that must collect and then discard large volumes of waste find themselves burdened with tremendous financial, manpower and

equipment needs, all at costs that are continually rising. It is for this reason that the nation's cities have actively supported source reduction measures: there is simply too much waste.

municipal collection and disposal

Waste reduction measures can mean three kinds of savings for local governments

- ☐ in direct costs of collecting, transporting then disposing of wastes;
- ☐ in reduced need for pollution abatement from waste disposal; and
- ☐ from reduced litter generation.

The reasons are evident: as each household generates less waste, less trash is collected, the truck makes fewer trips to the disposal site and fewer wastes must be buried or burned. Whether these potential savings are turned into actual savings depends, however, on how effectively local government responds to changing needs in waste handling.

Consider, for example, truck pick-up routes. Even if there were less trash needing collection, trucks would still have to make all stops they presently make. And, despite the fact that trucks might then need to make fewer runs to the disposal site, it is questionable whether rerouting to optimize reduced loads would actually occur. Certainly this pessimistic prediction would come true if a local government failed to reassess its collection and routing patterns to take advantage of source reduction benefits.

Container Type	Beverage Delivered (million oz.)[1]		Energy Required Per Million Oz. (million BTU's)[2]	Energy Consumed (trillion BTU's)		Energy Saving of All Returnable System (trillion BTU's)
	Present System	*All Returnable System*		*Present System*	*All Returnable System*	
Returnable Glass Bottle	293,554	1,007,654	184	54	186	(132)
One Way Glass Bottle	260,989	—	550	144	—	144
Aluminum Can	104,336	—	747	78	—	78
Bi-Metal (Steel) Can	348,775	—	443	154	—	154
Total	1,007,654	1,007,654		430	186	244

[1] Midwest Research Institute, Draft Report, Base Line Forecasts of Resource Recovery.
[2] Midwest Research Institute, Draft Report, Profile Analysis of Nine Beverage Container Alternatives.
Source: EPA. Energy Conservation Through Improved Solid Waste Management (SW-125)

Table 8: Energy savings of reusable beer and soft drink containers, 1972

It is also clear that transportation savings would occur only if there were *significant* cuts in waste generation. For example, cutting the waste load by a third will eliminate one trip in three to the disposal site, but a cut of 10 to 20 percent might well not show up immediately in savings. *(10)* Longer-term savings appear to be realistic, as local governments adjusted their waste collection operations and found the lifespan of their handling equipment prolonged.

Reduction of waste at source can lower disposal costs in another way: with lighter use of existing facilities there would be less need to acquire new disposal sites. EPA estimates that an 8 percent reduction in municipal waste generation could save, on a national average, between $70 and $90 million in disposal costs in 1985. *(11)* It should also be noted that fewer wastes requiring disposal will mean less leachate from landfills and less air pollution from incinerators.

Litter generation is also expected to decline sharply with source reduction measures. The Oregon experience shows that can and bottle litter has been reduced by 90 percent since the Minimum Refund Act went into effect. *(12)* Although this figure is challenged by some as misleading because the state is said to have increased its litter clean-up budget, few people would deny the overall litter-reducing effects of the Oregon law.

Container Type	Beverage Delivered (million oz.)[1]		Energy Required Per Million Oz. (million BTU's)[2]	Energy Consumed (trillion BTU's)		Energy Saving of All Returnable System (trillion BTU's)
	Projected System	*All Returnable System*		*Projected System*	*All Returnable System*	
Returnable Glass Bottle	295,673	1,406,980	184	54	259	(205)
One Way Glass Bottle	385,253	—	550	212	—	212
Aluminum Can	301,998	—	747	226	—	226
Bi-Metal (Steel) Can	424,056	—	443	188	—	188
Total	1,406,980	1,406,980		680	259	421

[1] Midwest Research Institute, Draft Report, Base Line Forecasts of Resource Recovery.
[2] Midwest Research Institute, Draft Report, Profile Analysis of Nine Beverage Container Alternatives.
Source: EPA. Energy Conservation Through Improved Solid Waste Management,

Table 9: Energy savings of reusable beer and soft drink containers, 1980.

People opposed to source reduction programs say, when faced with these data and assumptions, that similar savings would occur if there were widespread recycling. We want widespread recycling, but the major monetary savings from such resource recovery come solely from lower waste *disposal* costs, because wastes still have to be collected from the household and transported to a recycling facility. Furthermore, in small communities where a resource recovery system is not economically feasible because waste generation is small, reducing the amount of waste generated may be the only way to cut waste handling costs.

resource recovery

Many industries, especially those developing sophisticated recovery systems, say that if there is adequate recycling we won't need to reduce the volume of waste and that source reduction is in fact inimical to the success of recovery systems.

EPA has calculated that municipal waste generation will increase to 200 million tons by 1985. *(13)* In its 1974 report to Congress, EPA suggests that resource recovery may be viable for the wastes of 20 percent of the population, a figure based on concentrations of population and availability of land for disposal sites. On this basis, EPA estimates that 60 million tons would go through the recycling process, leaving 140 million tons each year to be disposed of in other ways. *(14)* American Can Company's assumption that 50 percent of U.S. solid wastes will be recycled (which is probably high) would still leave 100 million tons to be put somewhere. Even with as much recycling as possible, waste prevention seems needed.

Industry also contends that waste reduction would make resource recovery from the municipal waste stream unfeasible: since waste reduction would remove ferrous and nonferrous metals (and glass) from the waste stream, the most lucrative aspect of resource recovery would be virtually eliminated. In addition, removal of part of the organic fraction (paper and plastics) would reduce the heat value of trash and its worth as a source of energy. This allegation has caused many municipal solid waste managers to question the desirability of waste reduction efforts, since those who are planning capital-intensive resource recovery systems obviously wish to insure economically viable systems. EPA asserts, however, that even with reductions in waste as high as the top estimate of 30 percent, the United States will still generate more waste in 1985 than it does at the present time, *(15)* so that resource recovery will not be affected.

EPA has concluded that there are "much higher overall resource and energy benefits" associated with source reduction than with recycling, so that any conflicts between recovery and reduction are illusory. *(16)* Table 13 explains the agency's conclusions. If we were to burn all solid waste projected for 1980, the energy available would equal 832 trillion BTUs. Of this (still using 1958 as a baseline) some 82.4 trillion BTUs would be removed from the municipal waste stream through source reduction of packaging. *(17)* The net energy available for recycling or burning would still total almost 750 trillion BTUs. To this figure can be added the 322 trillion BTUs saved through reduced packaging production, so that overall, conservation would exceed 1,000 trillion BTUs. *(18)*

As the Washington Post editorial of April 2, 1975 said "Well, resource recovery and recycling is a fine idea, and we don't belittle the approach. But if the efficiency of recovery centers must rely on the maintenance of high volumes of trash, taxpayers may indeed wonder where this logic gets them. Does it make sense to design systems to accommodate wasteful . . . practices, or shouldn't the amount of waste be cut first? More and more government officials—in this region, in Congress and in the administration—are concluding that the first step is source reduction, which includes legislation embracing a phased approach to a returnable-container system."

the economy

In considering source reduction policies, arguments based on savings in resource consumption and in solid waste disposal pale beside the very real concerns about the effect of such policies on the economy. No one can say accurately what these effects will be. No solid economic analysis covering all the major ramifications is avail-

able, so there is no way to substantiate the arguments on either side.

Industry forecasts severe economic dislocations; environmentalists say those dislocations are exaggerated. Industry warns of the loss of jobs; environmentalists point to far less traumatic realignments within the work force, adjustments they view as well within our American industrial mode of continuously changing technologies and hiring patterns. No one denies the potential for disruptions as manufacture of some containers, packaging and disposable products is phased out. The severity of such disruptions and the ability of the economy to absorb dislocations are subject to much debate, as they should be. The uncertainty of finding reliable answers makes resolution of the source reduction issue difficult.

dislocation

Though valid generalizations are hard to come by, one thing is certain: particular plants and particular workers, not just abstractions—the economy . . . industry . . . employment—are affected by particular measures.

Packaging Material	Total Consumption (thousand tons)[1]			Total Consumption at 1958 per capita levels (thousand tons)[2]		Potential Material Savings with consumption at 1958 levels (thousand tons)		Energy Requirement Per ton (thousand BTU's)[3]	Potential Energy Savings with consumption at 1958 levels (trillion BTU's)[5]	
	1958	1971	1980	1971	1980	1971	1980		1971	1980
Paper	16,552	27,700	39,086	21,137	25,043	6,563	14,043	40,800[4]	267.8	573.0
Glass	5,063	4,900	6,608	6,465	7,660	(1,565)	(1,052)	15,256	(23.9)	(16.0)
Steel	5,340	5,235	6,168	6,819	8,079	(1,584)	(1,911)	29,590	(46.8)	(56.5)
Aluminum	97	212	507	124	147	88	360	196,632	17.3	70.8
Plastics	368	2,900	5,607	470	557	2,430	5,050	36,000	87.5	181.8
Total	27,420	40,947	57,976	35,015	41,486	5,932	16,490		322.5	753.1

[1] Office of Solid Waste Management Programs. Second Report to Congress; Resource Recovery and Source Reduction. Environmental Protection Agency, Publication SW-122. Washington, U.S. Government Printing Office, 1974. 112 p.

[2] Assumes a return to an equivalent 1958 packaging materials mix (i.e. the percentage of each material used in packaging is assumed to be constant). Economic growth, and increased standards of living, is allowed for by increasing total packaging required by a growth factor (the rate of increase in nondurable goods purchased).

[3] Gordian Associates, Energy Consumption for Six Basic Materials Industries, EPA Draft Report.

[4] Approximately 40% of this energy value is derived from the BTU's contained in the raw material (wood), not from purchased fuels.

[5] Assuming consumption at 1958 levels.

Source: EPA. Energy Conservation Through Improved Solid Waste Management

Table 10: Energy savings from decreased packaging materials, 1971 and 1980 (excluding beverage containers)

It is probably safe to say generally that it is the makers of packages and containers (and the makers of paper and plastic disposables) that would feel a tough waste prevention program most. Makers of the product packaged are less likely to experience a loss of sales, though some predict bad effects if they were to be forced to present their product in a less "convenient" or glamorous package.

To narrow the discussion to the beverage and beverage container industries, it is easy to see that changes proposed would affect both makers of the beverage and makers of the containers, but the disruptions would not be equally shared. The makers of beverage cans and bottles—both companies and workers—would experience far greater disruptions than the makers of the beverages themselves. And it is from the former, therefore, that the opposition to this kind of waste prevention is strongest and most vocal. Their arguments, which deserve serious consideration can only be summarized here. Those wishing to pursue them in detail should inquire from the National Soft Drink Association, U.S. Brewers Association, United Steelworkers of America (AFL-CIO-CLC), and the Glass Bottle Blowers Association.

Mandatory deposits on beverage containers would significantly decrease their share of the market and thus phase out almost all steel and aluminum shipments that go to can manufacturing. Data from the U.S. Department of Commerce indicate that reducing beverage can use by 75 percent would mean a $1.1 billion decline in metals shipments for this use *(19)*, with the greatest decline in aluminum, since far more aluminum than steel goes into making cans. Use of refillables would also affect brewers who ship nationally. They would have to change their current distribution method (shipping beer long distances in one-way containers) to a regional system.

In a report contracted for by the state of Oregon, Applied Decisions Systems, Inc. (ADS) reported that pretax profits in that state declined by $7.2 million—$9.3 million during the first year the law was in effect. (These figures include losses suffered by bottlers, canners, brewers, distributors and container manufacturers.) *(20)*

	1974	1980	% change
Alum. 2-piece	7.20	3.36	−52
Steel 2-piece	3.91	2.49	−37
Glass non-returnable	4.81	4.06	−16
Glass 10-trip returnable	2.60	2.44	− 6
Plastic	4.96	3.32	−33

Source: American Can Co. "Energy and Technical Development," 1974 briefing

Table 12: Energy requirements for 12-ounce beer containers (BTUs per million containers)

	A. Potential Energy Savings with Reusable Beverage Container System		B. Potential Energy Savings by Reducing All Other Packaging Materials to 1958 levels		A. & B. Potential Total Energy Savings All Packaging Materials	
Year	(trillion Btu's)	B/DOE[1] (000)	(trillion Btu's)	B/DOE[1] (000)	(trillion Btu's)	B/DOE[1] (000)
1971	244	115	322	152	566	267
1980	421	199	753	356	1174	555

[1]Barrels of oil per day equivalent
Source: EPA. Energy Conservation Through Improved Solid Waste Management

Table 11. Energy savings from decreased packaging materials, 1971 and 1980 (all containers and packaging)

	Paper	Plastics	Total
Potential materials savings in 1971 from reduced packaging Consumption to 1958 level (million tons)[1]	6.6	2.4	9.0
less: Portion not entering the waste stream (million tons)	2.0[2]	.4[3]	2.4
Net amount of materials not available to the total waste stream	4.6	2.0	6.6
less: 28 percent, the waste generated outside of SMSA's[4]	1.3	.6	1.9
Net amount of materials not available to the SMSA waste stream[4]	3.3	1.4	4.7
BTU's per ton of combustible material (million BTU's)[5]	14.8	24.0	
BTU's not available to energy recovery systems (trillion BTU's)	48.8	33.6	82.4[6]

[1] From Table 10.

[2] It was estimated that 30 percent of the paper does not enter the municipal waste stream because of recycling and diversions into other waste streams (water, industrial waste, scrap, etc.).

[3] It was estimated that 15 percent of the plastics does not enter the municipal waste stream for the reasons stated in Note 2, above.

[4] In the estimates of energy recoverable from solid waste, it was assumed that energy recovery is feasible only in SMSA's (Standard Metropolitan Statistical Areas), where economies of scale can be realized.

[5] Assuming paper at 7,400 BTU's per pound and plastic at 12,000 BTU's per pound.

[6] This energy "loss" of 82.4 trillion BTU's is smaller than the energy savings (322.5 trillion BTU's—see Table 10) from reduced packaging consumption.

Source: EPA, Energy Conservation Through Improved Solid Waste Management

Table 13: Impact of reduced packaging consumption on potential recovery of energy from solid waste

The immediate effect of a *ban* on nonrefillables would be greater, because cans would be eliminated from the market all at once. The beverage can manufacturing industry, with $1.5 billion in shipments in 1971 *(21)* would be wiped out, as would the present form of the beverage canning industry.

On the basis of the trends suggested above, many industries say that source reduction measures must necessarily have disastrous effects on the nation's industry. A former vice president of the American Can Co. stated, in testimony before the District of Columbia City Council, that beverage container legislation alone would mean the premature obsolescence of more than $1 billion worth of equipment. *(22)* While the source of this figure is unknown, arguments like these often spell the end to efforts to reduce waste at source. EPA bases its support for control of nonrefillables on its conviction that any national legislation would provide for a gradual phase-out of cans, not an abrupt discontinuance. Some advocates point out that it might be easier for the industry to adjust to a national law with gradualist features than to state-by-state legislation.

The impact of redesigning products is even less easy to forecast. Presumably, longer-lasting products mean fewer and less frequent replacements, but it is difficult to ascertain how affluent consumers would respond to longer-lived products. Will they, for example, continue to buy new and more modern appliances before older ones have outlived their usefulness? If premature discarding by first owners does occur, it is likely to mean that a larger proportion of durable goods will reach the secondhand market because of their increased durability and repairability. Manufacturers' production levels might be lower, but the profit per unit would not necessarily go down: Better built products would command higher prices. They would also require better workmanship, which might increase employment and wages.

employment

As with disruptions in industrial output, statements about unemployment impacts are based on speculation and guessing. The

specter of plant shut-downs has tended to ally many segments of organized labor with management in opposing source reduction measures.

Some employment impacts are readily visible: if a plant is shut down because a specific product is banned outright, then the jobs lost can be easily counted. If plant output is reduced, lay-offs may follow. But, looking at the work force as a whole, reduced employment in one sector may be offset by increased employment in another.

On the basis of data from the Research Triangle Institute (RTI), EPA estimates, for example that a federal law for mandatory deposits will reduce the container industry workforce by about 60,500 persons, virtually all of them skilled workers. Employment in the beverage and distribution industries is expected to *increase* simultaneously by about 60,800 workers, most of them unskilled. *(23)* These figures suggest that a shift to a mandatory deposit system may mean virtually no change, nationally, in the number of jobs. It should be noted, however, that labor income would drop, because of the change in the types of jobs—from skilled metalworkers to unskilled bottle handlers and bottle washers.

The Applied Decisions Systems, Inc. (ADS) report of the Oregon experience is inconclusive on the law's employment effects. Between 340 and 427 jobs were allegedly lost—200 to 265 in glass and 140 to 162 in cans. Between 175 and 200 new jobs were reported to have been created, resulting in a net loss of between 165 and 227 jobs. It should be noted, however, that only 19 percent of retail stores polled responded to the consultant's questionnaire, and it is in this sector that most new jobs were to have been created. Moreover, ADS did not count trucking labor, another sizable segment. *(24)*

How one feels about the controversy surrounding the jobs question depends on one's vantage point. Certain source reduction measures will indeed cause employee dislocations, but new jobs will also be created. The nuances between types of jobs lost or created has led to some disagreement among labor unions directly affected by source reduction. Steelworkers, for example, have been inalterably opposed to beverage container regulation; glass bottle blowers have been less adamant in their response. Some retail clerks' locals have supported such measures, because stores would have to add about one-half employee to handle returnables; other clerks' locals have objected.

Proponents of source reduction say that increased use of returnable packaging will actually help spur employment, because less skilled workers, among whom unemployment is high, will find new jobs available. Industry's and organized labor's arguments center around the need to maintain and hopefully increase current skilled employment levels in manufacturing. At the same time, however, industry also says that labor costs must be *cut back* in the retailing field. Both needs, industry says, can be achieved by producing and using more packaging.

tax revenues

The revenues collected by all levels of government to subsidize public service needs may be affected by certain waste reduction measures, but impacts will vary, depending largely upon the kinds of tax losses.

Industries whose equipment becomes obsolete, due to a phasing out of plant operations, after a particular waste reduction measure is implemented, will be able to depreciate that investment more quickly, thereby reducing taxable income. If wages decline, personal income tax revenues will necessarily decline as well. EPA estimates that most tax losses will occur during the period of transition following enactment of source reduction laws or policies, but the tax loss will eventually level off as new plant equipment is purchased. Should a mandatory deposit system for beverage containers be implemented, Midwest Research Institute (MRI) estimates that $803 million would be lost in revenues during the first year, assuming all beverage can production was eliminated and beverage sales declined by 8 percent. *(25)* If cans are not eliminated, and if sales remain stable, the decline will be less.

It is uncertain how much tax revenue loss would be offset by

reduced need for litter cleanup, reduced need for pollution abatement and by reduced waste collection and disposal costs.

sales volume

Source reduction policies will have differing impacts on sales, depending on the type of product and the type of regulation used. A system of mandatory deposits may lead to slightly decreased beverage sales, since there may be fewer sales outlets (i.e. fewer vending machines, or stores unwilling to handle returned containers) or consumers may switch to beverages for which there is no deposit (such as juice, wine or hard liquor). No one knows whether such a shift is likely to occur. Skyrocketing sugar prices, which drove up the cost of carbonated beverages, appear to have caused no reduction in their sales. MRI's study for EPA estimates a 4 to 8 percent decline in beverage sales. Held against an annual growth rate in the industry of 6 percent, that means no change in sales growth or one year of no growth with subsequent years growing at present rates. *(26)*

Reports differ on beverage sales in Oregon. Industry describes dire results; highly optimistic reports come from EPA, which found no change in sales volume. One of the most recent studies, by ADS, says that sales of beer and soft drinks did not grow but, on the other hand, did not decline either. *(27)* There appears to have been no impact on beverage sales in neighboring states.

Non-packaging items to which source reduction measures are applied may fare differently. If products last longer (such as tires or appliances), fewer replacements will have to be sold, but there has been little quantification of actual sales impacts. Again, higher retail price tags may offset sale of future items.

prices

How source reduction measures affect the cost of items will depend on substitute products and on industry and consumer responses. A top quality steel-belted radial tire, for example, costs $55 (plus federal tax) in Washington, D.C., while a top-of-the-line bias ply tire costs about $45 plus tax. *(28)* A $55 radial, guaranteed for 40,000 miles, ends up costing about $.0014 per mile, and with reasonable care may last well beyond the guaranteed mileage. A $45 bias ply tire, which *may* last 30,000 depending on driving habits, tire care, etc., ends up costing between $.0015 and $.0018 per mile, or about $4 to $16 more per 40,000 miles of driving than the radial. Thus while the longer-lived product is initially more expensive, its longer life—one that is guaranteed—makes it ultimately slightly less expensive.

The probable price pattern for durable goods in a source reduction economy, then, is higher initial costs that are likely to produce savings for the consumer in the long term. In the matter of beverage containers, the case is different. Beverage in a refillable container will probably cost less than the same quantity in a throwaway.

Under a mandatory deposit system, there might be an increase at the outset, to offset the cost of new plant equipment and increased handling, but these increases would be added to the currently lower price of returnables. EPA estimates that the unit price of a beverage would still be at least half a cent lower than the current nonrefillable price. *(29)* The ADS study on the Oregon experience bears out this prediction. It indicates that the price of beer did not increase overall as a result of the law and that the cost of soft drinks went down by 5 percent. *(30)*

There are two circumstances under which consumers could conceivably pay higher prices for beverages in returnables: first, if the consumer chose not to return the empty container, thereby losing the deposit; second, if the beverage industry decided to raise prices to protest government regulation of beverage containers.

Shortly after enactment of the Vermont beverage container law, the price of beer and soft drinks rose, raising questions as to whether such a price increase was due to generally rising costs or to an industry attempt to discredit the law. Investigations by the state's attorney general have thus far indicated no such intent, but price manipulation remains a threat in a jurisdiction contemplating packaging regulation.

6. industry activity

I urge you to deal with environmentalism using the same zeal with which you market your products—or this new form of competition is going to take your market from you. Call it consumerism . . . environmentalism . . . it's basically the same for your industry. It's potentially explosive and it seems to stem from an unanalyzed dissatisfaction of a segment of American people—and much of it directly against the business community. It's a conflict business must win for the good of our country. The people who out of ignorance or possibly action in their own social conscience seek to destroy or emasculate the fundamental underpinnings of our society—our country—and thus negate all our successes since this Nation began.

Frank W. Considine, President
National Can Corporation
October 5, 1970

While discussing the severe energy shortages during winter 1973-74, one EPA official remarked that most in-plant energy conservation programs were spurred not so much by high fuel costs as by industry's uncertainty over whether adequate supplies of fuel would be available for industrial use. Industry-sponsored programs to cut resource use and product waste have also arisen from in-plant needs to minimize costs and conserve energy. The volatility of world energy and materials markets has prompted strong and effective conservation measures.

Undoubtedly, industry has also been motivated by a desire to quiet the interest of government and the environmental movement in waste reduction programs that are regulatory in nature. There is far less likelihood of federal product regulation if industry can demonstrate interest and successes in resource and energy conservation. As a result, four approaches are being developed by various industries: product and packaging redesign, resource recovery, litter prevention, and waste control programs.

redesign of products and packaging

Every American is familiar with the cardboard barrels of chicken and boxes of hamburgers that are the trademark of the fast-food industry. Because of its reliance on packaging, this industry (a big one, with sales from the two largest companies totaling $3 billion in 1973) is an obvious target for source reduction measures. Depending as it does on its ability to prepare and serve inexpensive food that can be eaten in the restaurant or carried out, its basic system of food delivery relies heavily on the use of throwaway packaging. That use is extraordinarily large. One estimate puts the 1973 discards for the fast-food industry at 1.1 billion tons of paper packaging and 72,000 tons of plastic packaging. The paper packaging wastes from fast foods now constitute 2.5 percent of all paper packaging and 1.6 percent of all plastic packaging in the municipal waste stream. And since this industry is growing at the rate of 10 percent a year, we can expect these packaging volumes to grow accordingly. *(1).*

This kind of resource use and waste generation has led to intensified efforts to cut back on fast-foods packaging. The impetus towards conservation comes not just from government but from industry as well: as one of the largest buyers of packaging materials the industry has a strong practical interest in holding down costs. EPA and members of the fast-food industry have organized a task force to study packaging use and conservation measures, and a survey of industry programs and policies is now underway.

McDonald's, for example, has already redesigned and is now using a new container for one food it offers and is now testing a new box for other foods as well. Both containers use less paper, and one eliminates entirely the need for an outer wrapping. The company is also trying to develop a way to deliver an unboxed sandwich to the customer, and the chain has started to replace throwaway cardboard boxes with reusable pallets for delivery of food from plants to individual restaurants. *(2)* McDonald's has not estimated either the amount these programs will save in materials and energy or the cost of such

glossary

BTU British thermal Unit. A unit of heat required to raise the temperature of one pound of water one degree Fahrenheit.
1 barrel/oil = 5.8 million BTUs
1 kilowatt-hour electricity = 3,413 BTUs

BDOE Barrels of oil per day equivalent.

Durable goods Products that are designed for long-term use, including appliances, furniture and tires.

Energy recovery Any system by which waste is utilized for its fuel value. Wastes, usually the organic portion, can be burned directly or converted to fuel oil or gas.

Inorganic wastes Wastes derived from nonliving organisms, primarily minerals. Consist of metals and glass.

Leachate Liquid that filters through solid waste or other medium and has extracted materials from it. Often ends up in underground waters; may be toxic.

Municipal wastes or **post-consumer wastes** The solid waste generated by residential and commercial activities; not necessarily handled by a municipality.

Nondurable goods Products, excluding containers and packaging, that are designed for single or short-use. Include newspapers, magazines, paper plates, paper towels, etc.

Organic wastes Those wastes that are derived from plants or animals and contain carbon compounds. Consist of paper, fabric, plastics, food wastes.

Penny-a-pound Proposal for a tax, levied at the point of production, to cover collection and disposal costs of a product based on an average rate of $20 per ton (or 1¢ per pound).

Pollution intensiveness The extent to which a product or material causes pollution, because of its extraction, processing, manufacture or disposal.

Primary energy use Energy derived from basic fuels (oil, gas, coal).

Product redesign Changing the configuration of an item so that it uses less materials or energy in its manufacture or is made longer lasting, more easily repairable or less susceptible to style changes.

Product reuse Reusing a product that has been discarded without reprocessing it.

Resource intensiveness The extent of a product's or material's use of materials or energy in its extraction, processing or manufacture.

Recycling Process in which valuable materials are extracted from the solid waste stream and then utilized either in original or changed form. Most frequently recycling is returning a material into the process by which it was first formed (i.e. waste paper into paper making, crushed glass (cullet) into glass making).

Sanitary landfill Engineered method of land disposal for wastes in which trash is compacted and covered with fill dirt. Site can be used for other purposes after landfill is completed. Generally considered the best means of land disposal, although leachate may contaminate groundwater.

Scrap industry Also called the secondary materials industry. Includes purchasers, processors and users of recoverable waste materials.

Shipment value The sales value of a product being shipped from the manufacturer to the distributor or seller.

Source reduction Cutting down on materials or energy used in product manufacturing, or reducing the total amount of waste generated.

Yard wastes Plant cuttings and trimmings, including leaves, branches, etc.

programs to the company (or to the consumer). But Burger King, another large chain, estimates it has cut packaging use by 20 percent as a result of new procedures for food packages used within the restaurant. *(3)*

Most resistance to packaging changes arises because many chains' packages are their trademarks. To do away with a readily-identifiable package, no matter how materials intensive it is, seems disastrous to the company. In addition, while industries may be willing to revise some packaging forms, they claim that certain types of packages—for example, individual boxes for hamburgers—are essential to keep the food hot and fresh. EPA asserts, however, that the efficacy of the boxes for that purpose is debatable and that marketing decisions may motivate use of extraneous packages. *(4)*

It should also be noted that some packaging reduction is prohibited by law. The Food and Drug Administration, for example, will not permit Kentucky Fried Chicken to ship poultry in reusable containers. Since that chain uses 9 percent of all poultry raised for meat in the United States, *(5)* its huge packaging requirements cannot be reduced by reuse until the FDA changes the rules it now considers necessary. There appears to be no effort underway, from any direction, to convince the FDA to amend these rules.

As was noted earlier, a number of industries say that they will redesign products to meet social and environmental needs without the government requiring them to do so. American Can, for example, recently introduced a new can, Miraform II, which is said to be about 15 percent lighter than conventional two-piece seamless cans. *(6)* The can, made of aluminum or steel, is expected to save 400,000 tons of raw materials annually. *(7)* Similarly, Reynolds Metals Can Division has developed an aluminum can that is 7 percent lighter than cans now in use. According to Reynolds, energy used to produce each can would be about 5 percent less than is currently needed, and to this would be added the savings achieved through transportation of lighter cans. *(8)*

There is little information about other efforts by industries to reduce wastes through product redesign. In any case, the nation's economic downturn, with reduced capital available for industry investments, has slowed research and development generally.

resource recovery

Industry is interested in development of sophisticated systems for resource recovery from solid waste. Among the companies involved in research and development for recovery of materials and energy are some that are responding to growing pressures to reduce waste created by their own products. The rationale of these industries is that they, particularly the packaging and container sectors, will be subject to less criticism if they devise and help communities establish recycling systems. Container producers recognize that beverage containers might never have been singled out if waste management systems had been adequate.

The National Center for Resource Recovery (NCRR) was organized in 1970 by industry and labor as a nonprofit corporation to study the nation's solid waste problems and develop solutions through implementation of resource recovery. NCRR is directly supported by 17 industries and several labor unions. On NCRR's board of directors are executives of PepsiCo., Inc., the United Steelworkers, Anheuser-Busch, Inc., Procter and Gamble Co., ALCOA, U.S. Steel Corporation, B. F. Goodrich Co., and Continental Can, Inc. *(9)*

NCRR has had a major part in the planning and development of the New Orleans resource recovery facility. As a research organization, NCRR has taken a systems approach to solid waste management. Because the New Orleans project will be "a prototype facility to prove out—or disprove—various processes strung on line," NCRR "is cushioning with its own funds some of the risk of the still R&D aspects" there. *(10)*

The New Orleans plant, whose total cost is estimated at $5.7 million, is designed to process over 650 tons of waste daily (about half of the city's solid waste), from which it will recover ferrous and

nonferrous metals, glass, and some paper. The city of New Orleans will pay a dumping fee of $10.95 per ton but is expected to recoup some of that cost by sharing in the profits from the sale of recovered materials. *(11)* The city now spends more than $15.00 per ton to incinerate its waste.

The New Orleans resource recovery system will be capital intensive and privately financed. It will require a substantial investment by NCRR and by Waste Management, Inc., the company that has won the contract to build and operate the plant. The city's contract with Waste Management states that "if the quantity of recoverable resources in the solid waste delivered by the city or its delivering agent is significantly reduced as a result of laws or ordinances passed by the city . . . the city shall provide off-setting adjustments to the corporation to compensate for the corporation's loss of recovery revenue." *(12)* As NCRR explains it, the clause quoted from the contract will protect the investment in the facility by giving some assurance of the quantity of recoverable materials; "without the assurance of products through the system, amount of labor needed, cost of equipment, etc. there would be no way to formulate operating costs, revenues, etc." *(13)*

The desire of Waste Management, Inc. and NCRR, who have their money on the line, for a steady flow of solid waste is entirely understandable. The distaste of the companies and labor unions represented on NCRR's board of directors for laws and ordinances that would cut back solid waste generation is also understandable. But the contract that requires New Orleans to see that the minimum quantity of recoverable materials remains approximately the same will discourage the city from enacting waste reducing measures and, in a sense, will institutionalize waste generation.

An American Can Company subsidiary, Americology, Inc., is marketing a mechanical waste separation system that will recover ferrous metals, aluminum, paper, and glassy aggregate from mixed municipal wastes and will prepare the organic fraction of the waste for fuel. *(14)* In January 1975 the city of Milwaukee signed a $15 million contract with American Can for a 1200-ton-per-day resource recovery system whose refuse-derived fuel will be used by the Wisconsin Electric Power Company—about 600 to 700 tons per day. The entire capital investment ($18 million) will be supplied by American Can, who will own and operate the facility and sell the recovered materials. The city has the option, at the end of five years, of buying the plant and engaging American Can to operate it. The plant will handle all the city's solid waste and will reduce it 80 percent at a cost only slightly more per ton than the city now pays for landfilling. The city will share in the proceeds from sale of recoverables, and that share will be increased later if the city becomes the plant owner. The contract between American Can and Milwaukee contains a clause stating that the economics of the contract are based on present waste proportions; if changes that affect the economic situation of recovery of materials or energy are imposed by statute, the contract will be renegotiated.

Resource recovery is desirable (see *Recycle?*); about this there is no question. But the optimum approach is twofold: reduce the portion of the waste stream that can be reduced and apply resource recovery to the remainder. While technologically sound recycling systems are sorely needed, they do not guarantee that materials reuse will in fact take place. If demand for recovered materials remains low, with markets depressed, sophisticated resource recovery will be meaningless without stockpiling. Resource recovery ameliorates waste of materials and energy, but only after resources have been exploited. And the dependence on resource recovery alone creates no motivation for a company to reduce the quantity of its packaging, adopt reusable containers, or redesign its product.

litter reduction

Originally, industry's approach to waste proliferation, particularly of packaging and containers, concentrated on litter prevention and cleanup. Some industries continue to say that litter prevention is the preferable way to deal with solid waste, a way that, unlike legislation and regulation, will not affect the economy. The nuisance of litter, the

prevalence of beverage containers in litter, and the fact that litter has motivated consideration of beverage container legislation have led industry to support anti-litter campaigns. A familiar one is built around the slogan, "People Start Pollution; People Can Stop It."

Keep America Beautiful, Inc. (KAB) in particular has emphasized the "people problem" associated with litter. KAB and related organizations try to teach people not to litter and to inform them about the need for proper trash disposal. KAB has also developed an Action Research Model (ARM), a means of documenting the impact of public education on littering.

In addition to public education programs, KAB points to other litter prevention weapons that it claims are more desirable than laws. In testimony before the California assembly, occasioned by a bill modeled after Oregon's Minimum Refund Act, Roger Powers, KAB's executive director, said, "we know that net annual litter visibility would be reduced by at least 50 percent by increased pickup alone, and that other measures such as financial assistance to local government for litter control officers and increased litter receptacles locations could also be expected to reduce litter up to a total amount of 78 percent." *(15)* KAB's board of directors consists of representatives from industries and public organizations. With companies having the greatest stake in the beverage and container industries (e.g. American Can Company, the Brewers Association, Continental Can Company, Reynolds Metals and Coca-Cola) among its directors, KAB's position reflects continuing defensiveness toward attempts to regulate containers.

waste control

A very limited number of businesses have undertaken voluntary programs to reduce materials and energy consumption and cut down on waste generation. Red Owl Food Stores, a chain of 130 supermarkets in Minnesota, Wisconsin, Michigan, North Dakota, South Dakota and Iowa, has initiated an experimental "waste control" program that encourages products and packaging reuse whenever possible. The "Bring 'Em Back and Save" program operating in 12 stores urges shoppers to return used shopping bags, egg cartons and milk containers for refill and reuse. The stores give customers 2¢ for every shopping bag, 3¢ for every egg carton and 4¢ for every refillable milk container returned. Red Owl estimates that an 8-week experimental program saved 5.5 tons of packaging. *(16)*

Red Owl is also encouraging less materials-consuming habits and has tried to stock items that reflect conservative use of materials and energy. The chain refused to accept bananas from one produce company because they came wrapped in plastic containers—an example of overpackaging. Red Owl has urged other food chains to do likewise. Similarly, when a food company introduced an experimental plastic salt container to replace a paper one, the chain convinced the manufacturer that the plastic container was superfluous and it was withdrawn from the market. When one dairy introduced a nonreturnable plastic milk container, Red Owl refused to carry the product until the dairy prepared an environmental impact statement outlining the new container's effect on solid waste generation, energy and materials consumption, and pollution. *(17)*

Despite their apparent success, Red Owl's programs have not been widely adopted, but one of its executives, Alan K. Greene, is hopeful that his company's awareness is slowly influencing other retail food stores. While the industry, under the umbrella of the National Association of Food Chains, continues to oppose returnable beverage container legislation, Greene believes that the trade association is becoming far more tolerant of dissenting views among its members and is far more open to implementing resource-conserving policies. *(18)*

Greene pointed out that the company's policies are based primarily on business needs; Red Owl has found it in its own best interest to develop conservation programs. Altruism, while it obviously does exist in some executive suites, is *not* a powerful motivating factor for business. But in at least some cases—perhaps in more cases than is now recognized—what is best for the consumer and the environment may also be best for business.

7. legislative approaches

Voluntary action directed at source reduction has been slow to happen and seems unlikely on a national scale. Packaging standards are a spectre to the private sector, raising basic questions about our systems of production and marketing. It is easy to say waste production ought to be controlled, but working out methods and procedures and determining the guiding criteria are highly complex and intricate assignments. Nonetheless, it must be done.

CITIES AND THE NATION'S DISPOSAL CRISIS,
National League of Cities—U.S. Conference
of Mayors, 1973.

Attempts to reduce the solid waste stream through legislation have been made at every level of government, with varying degrees of success.

the federal role

Since many people believe that far-reaching waste prevention will come about only with a uniform national policy, pressure on the Congress to enact source reduction laws is increasing. During the 93rd Congress, at least a half dozen bills dealing with source reduction were introduced. The bills fell generally into two categories.

The first, the "bottle bills," were attempts to institute the use of returnable, refillable beverage containers on a nationwide basis. Most proposals were modeled after the Oregon Minimum Refund Act and, as a matter of fact, were introduced by members of Oregon's House and Senate delegations.

Hearings on one such proposal were held by a Senate subcommittee, but the bill never reached the Senate floor.

The second approach to source reduction legislation came as part of several general solid waste bills introduced in both houses. The bills, which sought to stimulate the development of markets for recovered materials and the construction of resource recovery systems, also provided for EPA to promulgate product standards and regulations to limit, if necessary, the entry of specific products and materials into the solid waste stream. EPA was to determine the suitability of regulations on packaging and other items after study of their resource consumption, disposability and potential reusability. No bill specifically outlawed a particular product or package; that action would be taken by EPA *only* after study and public comment.

The vagueness of many of the product-standard sections in this bill triggered immediate and generally negative responses, particularly from industry. As earlier discussion showed, singling out specific products or regulating entire classes of products presents so many legislative and enforcement problems that few congressmen were willing to accept *any* approach. (As a result of unresolved differences over implementing resource recovery and source reduction, the 93rd Congress ended its term by passing only an extension to the present authorization law, the Solid Waste Disposal Act.)

The demise of *all* new proposals in the 93rd Congress can be attributed to a number of factors. The nation's faltering economy made it hard for many congressmen to contemplate any legislation whose impact on employment and production was at best uncertain and possibly detrimental, a fear fueled by testimony offered at the bottle hearings that gloomily predicted economic chaos. The nation's energy shortages were also occupying congressional attention, and, despite the fact that energy savings could be realized through returnable container and other source reduction legislation, many lawmakers were intent on other more dramatic and immediate energy programs. Finally, in an effort to increase energy supplies and strengthen the economy, lawmakers attacked what they called superfluous environmental programs said to stall development of new energy sources. In this atmosphere, it is understandable that source reduction measures were ignored.

It should be noted that public pressure for source reduction meas-

ures was virtually nonexistent. A number of environmental and citizen organizations actively supported the programs, but, by and large, public apathy meant that congressmen felt no push for comprehensive solid waste legislation. Tom McCall, former governor of Oregon and the man who actively worked for passage of the Oregon bottle law, points to the evident need for public education: "It's a matter of raising the national consciousness." *(1)*

In what was a surprise to many, two federal agencies actively supported attempts to restrict the use of throwaways. EPA and the Federal Energy Administration testified on behalf of the measures, although both suggested the desirability of phasing in a deposit system to avoid abrupt shifts in manufacturing operations.

From the number of agency-sponsored studies cited in this report, it is evident that EPA has intensified its interest in and commitment to source reduction. Many of the conclusions reached by EPA on the basis of those studies have already provided the fuel for the 94th Congress' source reduction proposals.

state governments

In the absence of federal legislation, several states have enacted measures affecting waste generation, but, as with federal legislation, successes have been limited because legislators fear the economic impacts of source reduction. To this reluctance must be added a lack of public support and a general belief that effective source reduction programs must come from the federal government.

Oregon is, of course, the state that initiated waste reduction through its bottle law. Governor McCall, recollecting his accomplishments during his two terms in office, has called the law "a proven antidote to the national disease of overconsumption," and he views that law as *the* most important of the state's many environmental accomplishments. *(2)*

Vermont's "bottle bill" has met with less acclaim, due primarily to the language of the law and to its relative newness. (A number of challenges to the law's constitutionality delayed its implementation.) However, the law has been strengthened recently by adding a ban on throwaway bottles, flip-top cans and plastic binders. South Dakota is the only other state with a beverage container law.

Proposals before other state legislatures to reduce waste generation did not meet with the same success as those of Oregon, Vermont or South Dakota. Bottle bills were introduced in about 40 states, but none was enacted.

New attempts to pass bottle laws are expected in 1975, not only in states where there were previous efforts but in others as well.

Only one state, Minnesota, has enacted a law regulating all new or redesigned packaging introduced in the state. The state's pollution control agency (MPCA) has promulgated Regulations for Packaging Review that detail the procedures by which the acceptability of new or revised packages can be determined. The rules state that the agency will compare new packages with existing ones or with alternative packages, with an eye to maximizing "material and energy conservation while minimizing adverse environmental impact and increased economic costs to the people of the state." *(3)* All packaging subject to regulation will be viewed in light of potential toxicity or harm; energy and materials use, particularly of scarce or nonrenewable resources; recyclability; and impacts on consumers, labor and industry. If alternative forms of packaging, with fewer impacts, are available, then the agency can require that they be substituted for the proposed package. The rules were recently approved by the state attorney general and went into effect January 1, 1975, *(4)* but the agency is apparently inadequately staffed to handle all packaging review.

It is difficult to predict what actions states will take during the coming months, but a recent survey of all states' solid waste programs by *Waste Age* magazine has revealed a definite interest in source reduction. State officials were asked to list what they thought federal priorities in solid waste management should be and were given a choice of options such as financial and technical assistance. Source reduction was *not* included, but responses nonetheless ex-

pressed strong support for federal source reduction legislation and guidance. One state went so far as to say that source reduction should be the one and *only* federal solid waste priority. *(5)* Responses such as these indicate a growing awareness on the part of state governments of the need for uniform national source reduction programs.

local governments

A small number of cities and counties around the country have also enacted source reduction ordinances, all of them oriented to beverage containers. According to the International City Managers Association, of the 1,115 cities responding to an ICMA survey, 15 reported enactment of beverage container laws. *(6)* Local governments with such laws now include Bowie, Maryland, recently upheld in court; Oberlin, Ohio; Howard County, Maryland; Loudoun County, Virginia; and Cayuga County, New York. (The last three are all in litigation at the present time.) Bills that did not pass were considered in other places, including Philadelphia; Montgomery County, Maryland; Dade County, Florida; and Washington, D.C.

While it is expected that many cities will attempt to enact local bottle laws in 1975, virtually all supporters of such laws admit that local approaches are stopgaps at best and make few dents on waste generation or materials use. The greatest value of a local source reduction ordinance is its potential for raising public consciousness. Aroused public sentiment could hasten more encompassing proposals at higher levels of government.

8. EPA's role: source reduction program needs

. . . perhaps in the long run most important of all, we must seek to reduce the amount of unnecessary waste that we generate. We must begin to consider the total environmental consequences of our traditional mining, manufacturing, marketing and distribution practices and alter them as necessary in our time, rather than waiting until yet another crisis has engulfed us . . . if we continue to indulge in a 'no deposit, no return' attitude towards our earth and its resources, we will run out of energy and irretrievably ruin our environment. The earth and its resources are not simply another disposable, replaceable commodity.'

Russell E. Train, Administrator, U.S. EPA
December 3, 1973

It becomes increasingly evident that some source reduction measures need further study before they are implemented, but a number, particularly those that are voluntary, appear feasible now.

At a national workshop conducted by OSWMP in Washington D.C. last April, John Quarles, deputy administrator of EPA, urged citizens and industry to cooperate, making clear the importance EPA places on voluntary efforts to reduce waste generation.

consumer education

If Governor McCall's assessment is correct, that people's environmental awareness must be heightened, then educating citizens to the choices available to them appears obligatory. Just as there have been efforts to require that electric appliances be labeled to show their energy use, so there has also been a limited attempt to convince manufacturers to advertise the energy and resource requirements of other products. Implementation of such a program appears distant, however.

How effective can such materials and energy labeling programs be? Public response is obviously dependent on many factors. We

can assume that greatest demand for and attention to labeling will come from those segments of the population that are environmentally aware. Widespread changes in purchasing habits might be forthcoming, however, if the prices of items reflected their true resource and environmental impacts and costs.

"jawboning" with industry

The fast food industry's program on materials-use reduction arose as a result of joint efforts to develop source reduction approaches acceptable to government and industry. Gentle persuasion may be the most desirable strategy at the present time and indeed may be the *only* type of program foreseeable for the near future. EPA anticipates publicizing industry programs as they are developed and plans to issue fact sheets on source reduction developments in industry during the coming months.

voluntary and legislative activities

Despite EPA's belief that voluntary efforts are needed to produce viable and effective waste reduction programs, the agency does *not* rule out the need for selective legislative approaches for specific products. The most likely candidates at the present time appear to be beer and soft drink containers.

studies and policy development

The lack of comprehensive data on source reduction measures and their impacts necessitates an expanded research program, including analysis of the costs and benefits of source reduction and public receptivity to such programs. Among the studies to be undertaken by EPA will be an analysis of where source reduction programs are possible, what the specific targets of such programs should be, the feasibility of a phased deposit system for beverage containers, and the issuance of *voluntary* guidelines for source reduction pursuant to Section 209 of the Solid Waste Disposal Act.

EPA says its interest in source reduction is moving steadily from a single-target approach (beverage containers) to the more general product design level. If government intervention in the market place is to occur, it may be most feasible at the design stage rather than at the stage where external constraints must be placed on the product.

9. the role of the public

After Hiroshima it was obvious that the loyalty of science was not to humanity but to truth—its own truth—and that the law of science was not the law of the good—what humanity thinks of as good, meaning moral, decent, humane—but the law of the possible. What it is possible for science to know science must know. What it is possible for technology to do technology will have done. . . . The frustration—and it is a real and debasing frustration—in which we are mired today will not leave us until we believe in ourselves again, assume again the mastery of our lives, the management of our means.

Archibald MacLeish SATURDAY REVIEW
Oct. 14, 1967

As has been shown throughout this report, source reduction measures will affect the consumer's options by altering price, product availability and convenience. Whether manipulation of these factors is desirable or not is questionable.

Many manufacturers of nondurables, packaging and containers, point to the ways in which their products have increased consumer convenience by eliminating the need to return empties to the store or to wash soiled plates or napkins. Elimination of these chores is said to have made the consumer dependent on throwaway products, so that consumers now *demand* their continued production and any cessation of production would in effect create a hardship on the purchaser. Manufacturers thus say that there is no consumer demand for returnable or reusable products.

In an article in the *New Yorker,* Richard N. Goodwin points out the illogic of this kind of argument. The auto industry, according to Goodwin, manufactured gas-guzzling automobiles through the 1950s and 60s because there was no public demand for small cars. With the influx of small European cars into the U.S., however, that demand suddenly materialized, and the American auto industry began building smaller, more economical cars. Says Goodwin: "There can be no demand for a product that is not readily available."

(1) What has happened in terms of throwaway products is that consumers have been inculcated with a kind of throwaway value system. Having come to expect certain articles, people do not clamor for alternative products, which could be far more conserving and protective of the environment.

Recognition of our wastefulness will force us to reassess virtually all our activities and demand the end to the throwaway ethic. Under the present system each consumer imposes his individual disposal costs upon the rest of society, an act rational from the individual's viewpoint but irrational and inefficient from the social viewpoint. Energy shortages, food shortages, resource shortages, and a fragile economy will force us to redirect our priorities. Reduced convenience may be relatively painless compared to the alternative.

During congressional hearings on beverage containers, several container manufacturers hinted at the specious argument that source reduction measures are an invention of upper middle class environmentalists. Use of returnables was said to place an onerous burden on the poor of the inner city since most inner-city residents walk to stores and will therefore be forced to carry heavy bottles back and forth. In addition, container companies said that if prices for beer and soft drinks were higher, because a deposit had been added to the basic price, the inner-city resident would again be discriminated against. Warnings that source reduction measures are inherently elitist, if not racist, have deterred legislators who might otherwise support such measures.

Industry arguments such as these are difficult to substantiate. People who walk to and from stores now must carry filled cans or bottles home so that the weight of empty refillables on the trip back to the market would seem to have little effect. Most importantly, there is no logical reason why a person who is able to carry loaded shopping bags home from the store should be unable to carry empty containers to the store.

The Red Owl Supermarket experience with returnables confirms this reasoning. Alan Greene stated that the "Bring 'Em Back and Save" program was most successful in university and inner-city areas and least successful in outlying suburban areas where all shoppers drove to stores. This success can be explained by the fact that inner-city residents made frequent, often daily, trips to stores and would always carry empty bottles or used shopping bags with them. In addition, the bounty on bags, egg cartons and bottles encouraged many people, primarily children, to actively seek discarded products which they then returned for a rebate.

When consumers are able or are required to buy returnables, their response has been favorable. A report on Oregon's Minimum Refund Act by Applied Decision Systems, Inc. (ADS) said that 80 percent of all persons polled by the firm stated that Oregon's law had not inconvenienced them or else was worth the inconvenience because of reduced litter. *(2)*

It should be noted that even if a consumer wishes to buy returnable beverage containers he often is unable to do so. In a survey of Washington, D.C., Environmental Action, Inc. found that less than 15 percent of 361 liquor stores sold beer in returnable bottles, and these containers could only be purchased by the case and were not displayed on the shelves. *(3)* Similarly, many supermarkets do not carry carbonated beverages in returnables or carry only a limited selection of brands in returnables. And vending machines are increasingly dominated by beverages in cans. Disparities between the price of refillables and throwaways arise only because of the deposit that is added to returnables. Since the consumer gets a refund for all empties returned, returnables in the end cost no more than non-returnables. A switchover to reusables may actually lower beverage cost. The same Washington survey found that a case of beer in returnables costs 81¢ less than a case of throwaways. *(4)*

In the case of durable goods, potential inequities due to price differentials are harder to disprove: radial tires *are* more expensive than bias ply tires, but, as was explained earlier, they offer real savings in terms of lifetime cost. It should be noted that placing a guaranteed life-span on many other durables is not as easy as it is for tires, because there are no models of performance against which we can evaluate those products. Few manufacturers willingly guarantee their products and among those who make guarantees, some do so only to spur lagging sales.

10. a final word

In his book, *Future Shock,* Alvin Toffler characterizes the abundance of products available to consumers as "overchoice." But many people—and not just labor and industry—would disagree. Do we as a nation consume and waste too much? Must we eliminate certain practices and products because of their ramifications? These are in some respects philosophical questions requiring philosophical answers. But there are also factual answers, substantiated by data, that may indeed point to the need for reducing consumption.

The question of costs and tradeoffs, an expression that has become increasingly prevalent in recent months, obviously must arise. What are we willing to do to achieve certain goals? Will we shift employment from the manufacture of packaging and nonreturnable bottles into production of goods that helps in pollution abatement? It appears to many people concerned about the environment that, all too often, environmental considerations are considered trimmings, superfluities that must be sacrificed at times of crisis. The environment is most often traded-off; we accept dirty air or a blighted landscape because threats of joblessness and depression hang over us, because we are told that we need more energy. We do not stop to consider that including the cost of pollution and solid waste and litter collection and disposal as part of the cost of production (internalizing the cost) will go far to rationalize these trade-off decisions.

The question of how much intervention in the marketplace, if any, can occur without damaging individual freedoms and the free enterprise system grows more heated as the nation attempts to extricate itself from its economic woes. In a recent *New Yorker* article, Richard N. Goodwin made some observations about economic theory that are surprisingly relevant to issues of reducing waste generation and resource use. He pointed out that every society evolves its own system for making such economic decisions about use of factories, capital, and resources. "That system may consist of a dictator's will, of socialist managers, or of the untrammelled operation of the law of supply and demand. We have relied—at least until recently—upon a regulated market whose animating spirit is that the principle of competition . . . private conflict . . . the struggle to make money . . . will impel the most efficient and productive use of resources." *(1)*

Goodwin goes on to say that competition or the threat of competition can lead to development of desirable new technologies and products that meet changing social or resource needs; at the same time, competition can keep industry in line, ensuring that managerial decisions are predicated on actual social needs. But, according to Goodwin, this kind of competition can occur *only* when there is a regulated market, one in which the government plays a role. "Outside the regulated market, our society has no way to deter or penalize the wasteful use of resources, to compel technological innovation, or to direct production towards the satisfaction of public wants. Indeed, without competitive challenge, we cannot even measure waste, inefficiency, or technological stagnation. There is no standard by which to compare actual performance and possible performance." *(2)* The failures of the marketplace as it is now regulated indicate that new forms of economic life must emerge; the mere extension of public authority does not in itself guarantee its usefulness or efficacy. The conclusion that must be drawn, then, is the need to restructure our priorities to reflect the resource needs of the nation as a whole. Government regulation of particular products or product classes is not in itself a panacea, just as a free rein to industry to develop whatever products and packages it wishes is no solution. Changes in consumption, in attitudes, in perceptions of the world must enter in. We simply must recognize that if we do not conserve, and conserve effectively, we will damage the planet and its people and its institutions beyond repair.

suggested reading

Materials listed as printed by GPO can be ordered by writing to: Superintendent of Documents, Government Printing Office, 710 North Capitol Street, N.W., Washington, D.C 20402. GPO publications must be prepaid at the prices quoted; allow up to six weeks for delivery. Single copies of publications with one asterisk (*) are available FREE from the Solid Waste Information Materials Control Section, U.S. EPA, Cincinnati, Ohio 45268.

American Can Company. ENERGY AND TECHNICAL DEVELOPMENT. 1974. 14pp. Available from American Can Company, 1660 L Street, N.W. Washington, D.C. 20036. Discusses the development of American Can's new can manufacturing technologies, with estimates of the energy savings available through such containers. Contains data on actual materials and energy savings from a variety of container types.

Citizens' Advisory Committee on Environmental Quality. ENERGY IN SOLID WASTE—A CITIZEN GUIDE TO SAVING. 1974. 39pp. $1.25 (25% discount on orders of 100 or more). Washington: GPO. A discussion of the solid waste, resource and energy ramifications of our affluent society. Focuses primarily on citizen activities, particularly in the field of source reduction, but suggests that voluntary action alone may not be enough to stop wasteful trends.

Hannon, Bruce. SYSTEM ENERGY AND RECYCLING: A STUDY OF THE BEVERAGE INDUSTRY. March 17, 1973. 26pp. Urbana, Illinois: Center for Advanced Computation, University of Illinois at Urbana-Champaign, CAC Document No. 23. One of the earliest and most comprehensive analyses of the energy requirements of a variety of beverage container types. Now available from NTIS, 5285 Port Royal Road, Springfield, Virginia 22151. pub. #233183/3 (paper) $3.75.

Laws, Priscilla W. "The Great Container Throwaway." NEW YORK TIMES, February 25, 1974. An article detailing the wastefulness of throwaways and the potential savings from a return to returnables by an associate professor of physics at Dickinson College.

League of Women Voters Education Fund. RECYCLE? IN SEARCH OF NEW POLICIES FOR RESOURCE RECOVERY. Pub. no. 132. 1972. 39pp. (paper). 75¢, bulk rates on request from the League of Women Voters of the U.S., 1730 M Street, N.W., Washington, D.C. 20036. A comprehensive view of recycling that examines the history of resource recovery, impediments to recycling, the state of the art, future trends in the field. Also contains a complete bibliography of solid waste literature.

* Lowe, Robert A., Michael Loube, and Frank A. Smith. ENERGY CONSERVATION THROUGH IMPROVED SOLID WASTE MANAGEMENT. 1974. 39pp. Washington, D.C.: GPO. A report of staff in the Office of Solid Waste Management Programs, EPA, on potential energy savings from a variety of solid waste policies. Contains lengthy appendices and data.

Milgrom, Jack and Aaron Brody. PACKAGING IN PERSPECTIVE. A Report to the Ad Hoc Committee on Packaging. 1974. 234pp. (paper) $10. Executive Summary $1.00. Available from Arthur D. Little, Inc., 25 Acorn Park, Cambridge, Mass. 02140. Attention Mr. B. Folger. A study commissioned by the manufacturers and users of packaging materials that examines the role of packaging, the users of packaging and its impacts on solid waste and the economy.

* National League of Cities-U.S. Conference of Mayors. CITIES AND THE NATION'S DISPOSAL CRISIS. March 1973. 46 pp. (paper). The report of a NLC-USCM task force on solid waste management which contains the results of a survey of local government needs for solid waste. It also contains recommendations for solid waste management policy at the federal, state and local level. The "definitive" survey of local government and solid waste.

Oregon Environmental Council. OREGON'S BOTTLE BILL—TWO YEARS LATER. Single copies $2.50. Available from the Oregon Environmental Council, 2637 S.W. Water, Portland, Oregon 94201.

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* Research Triangle Institute. AN EVALUATION OF THE EFFECTIVENESS AND COSTS OF REGULATORY AND FISCAL POLICY INSTRUMENTS ON PRODUCT PACKAGING. March 1974. 301 pp. (paper). A report prepared for EPA that assesses the feasibility of two kinds of regulation of consumer products packaging. It contains extensive data on packaging proliferation, consumption, expenditures and trends.

Taylor, Patricia. "Source Reduction: Stemming the Tide of Trash." ENVIRONMENTAL ACTION, vol. 6, no. 7 (August 17, 1974). 4pp. Copies available from Environmental Action, Inc., Room 731, 1346 Conn. Ave., N.W., Washington, D.C. 20036. An environmentalist's view of source reduction, concentrating on its impacts on materials and energy use.

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20036. A discussion of beverage containers from an environmentalist's point of view.

"The Controversy Continues Over Oregon's Ban." THE AMERICAN SOFT DRINK JOURNAL. January 1974. 15pp. Available from American Soft Drink Journal, 136 Church Street, Jonesboro, Ga. 30236. Two opposing views of Oregon's "bottle bill" by a former executive of the American Can Company and the president of Chokola Beverage Co.

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*U.S. Environmental Protection Agency. SECOND REPORT TO CONGRESS ON RESOURCE RECOVERY AND SOURCE REDUCTION. 1974. 112pp. (paper). Annual report, as required by Section 205 of the Solid Waste Disposal Act, detailing EPA's studies of resource conservation and environmental protection. Discusses solid waste issues, federal policies on materials use, resource recovery, product controls, special wastes and product redesign.

FOOTNOTES

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[2]Council on Environmental Quality, "Calculating Abatement Costs" in *Fifth Annual Report,* GPO, (1974) p. 224.
[3]National League of Cities—U.S. Conference of Mayors, *Cities and the Nation's Disposal Crisis,* (1973), p. 1.

Chapter II

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[3]For a complete discussion of the impediments to recycling, see *Recycle?—In Search of New Policies for Resource Recovery,* League of Women Voters Education Fund, Pub. No. 132, 75¢, (1972).
[4]For a detailed discussion of the Malthusian vs. Cornucopian attitudes, see *MORE?,* League of Women Voters Education Fund, Pub. No. 104, 75¢, (1972).

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LWVEF publications on solid waste management

RECYCLE? In Search of New Policies for Resource Recovery. Federal laws, programs, and policies impeding reuse, reclamation, and recycling of solid waste. Federal changes that might increase demand for recyclable materials and industrial and governmental initiatives to reduce generation of solid wastes. Bibliography. 1972, EF, 39 pp. #132, 75¢

MORE? The Interfaces Between Population, Economic Growth, and the Environment. Outlines the relationships among population, environment, employment, renewable and nonrenewable resources, national and regional economic development. Concerns for urban development, transportation, land use policy, and national growth. 1972, EF, 44 pp. #104, 75¢.

Solid Waste—It Won't Go Away (CF). Explains solid wastes—today's practices and problems in waste collection and disposal. Considers governmental responsibilities; fragmented authority vs. regional cooperation. Bibliography. Nov. 1971, EF, 12 pp. #675, 50¢

Solid Waste—It Won't Go Away Unless . . . A Sampling of What Citizen Leaders Can Do. Adapted from the LWVEF's report to the Office of Solid Waste Management Programs. 1974, EF, 16 pp. #513, 25¢.

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